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TRANS-

TRANSACTIONS

OF THE

LINNEAN SOCIETY.

I. *Descriptions of some minute British Shells. By the late John Adams, Esq. F. L. S.*

Read February 6, 1798.

I BEG to lay before the Linnean Society the specific characters, with additional observations and drawings, of some minute Shells, which have fallen under my observation since my last paper on this subject.

Pembroke, Jan. 14, 1798.

BULLA.

truncata. 1. B. testâ subovali apice truncatâ.

TAB. I. *fig.* 1, 2.

Sand at the Wash, rare.

Obs. Colour white, opaque.

denticulata. 2. B. testâ oblongâ subæquali obtusâ lævi, aperturâ ad apicem denticulâ acutissimâ.

TAB. I. *fig.* 3, 4, 5.

Sand at the Waſh, not common.

Obſ. Shell pellucid, white.

punctata. 3. B. teſtâ oblongâ ſubæquali tranſversè punctatâ.
TAB. I. *fig.* 6, 7, 8.

South Sands at Tenbigh, very rare.

Obſ. Shell pellucid, with diſtant longitudinal ſtriæ.

emarginata. 4. B. teſtâ gibbâ, aperturâ emarginatâ.
TAB. I. *fig.* 9, 10, 11.

Obſ. Shell pellucid, ſmooth; lip ſubarcuated. B. *emarginata*, *punctata*, and *denticulata*, agree in their general habit; and *truncata* is moſt nearly allied to *cylindrica*.

TURBO.

trifaſciatus. 1. T. teſtâ lævi quinque anfractibus ſubobſoletis faſciatis, aperturâ ovali.
TAB. I. *fig.* 12, 13.

Sand at the Waſh.

Obſ. Shell pellucid, imperforated, whitiſh, with two tranſverſe red bands on the firſt ſpire, and one on the ſecond.

membranaceus. 2. T. teſtâ lævi quinque anfractibus obliquè faſciatis, aperturâ ſubovali.
TAB. I. *fig.* 14, 15.

Sand at the Waſh.

Obſ. Colour yellowiſh brown, thin, pellucid, with oblique

oblique yellow-brown ſtripes, imperforated; readily diſtinguiſhed by its membranaceous appearance.

interruptus. 3. T. teſtâ lævi quinque anfractibus ſubobtuſis, aperturâ ſubrotundâ.

TAB. I. *fig.* 16, 17.

Sand at the Waſh.

Obſ. Shell gloſſy, pellucid, white, imperforated; ſpires with interrupted longitudinal bands of a rich ochreous colour.

ſubrufus. 4. T. teſtâ lævi quinque anfractibus ſupernè ſubangulatis.

TAB. I. *fig.* 18, 19.

Lenny Bay.

Obſ. Shell opaque; colour dull red; upper part of each ſpire marked with a white tranſverſe band.

HELIX.

faſciata. 1. H. teſtâ lævi tribus anfractibus, primo ventricoſiore, ſubumbilicatâ, aperturâ ampliatâ.

TAB. I. *fig.* 20, 21.

Sand at the Waſh. Tenbigh.

Obſ. This delicate ſpecies is pellucid, white; firſt ſpire marked with three tranſverſe belts of a rich marone colour, the middle one broad, the lateral ones narrow.

nitidiſſima. 2. H. teſtâ duobus anfractibus, ſubtiliſſimè tranſversè ſtriatâ.

TAB. I. *fig.* 22, 23, 24.

Obſ. Corneous, pellucid, umbilicated; eaſily diſtinguiſhed by the uncommon brilliancy of its gloſſineſs.

bicolor. 3. H. teſtâ lævi duobus anfractibus, vix umbilicatâ.

TAB. I. *fig.* 25, 26, 27.

Tenbigh.

Obſ. This ſpecies differs from the preceding, to which it is nearly allied in other reſpects, in being perfectly ſmooth, devoid entirely of any gloſſineſs, and in having the inſide of the ſhell white.

SERPULA.

ovalis. 1. S. teſtâ ſubovali imperforatâ.

TAB. I. *fig.* 28, 29, 30.

Tenbigh, common.

Obſ. This ſpecies agrees nearly with *fig.* 1. *pl.* 1. *Walker's Minute Shells*, but differs evidently in never being perforated.

reflexa. 2. S. teſtâ regulari rotundâ, *aperturæ margini reflexâ.*

TAB. I. *fig.* 31, 32.

Sand at the Waſh.

Obſ. Gloſſy, white, perforated; aperture above the plane of the ſpire.

cornea.

cornea. 3. S. teſtâ regulari rotundâ pellucidâ, tribus anfractibus.

TAB. I. *fig.* 33, 34, 35.

Sand at the Waſh.

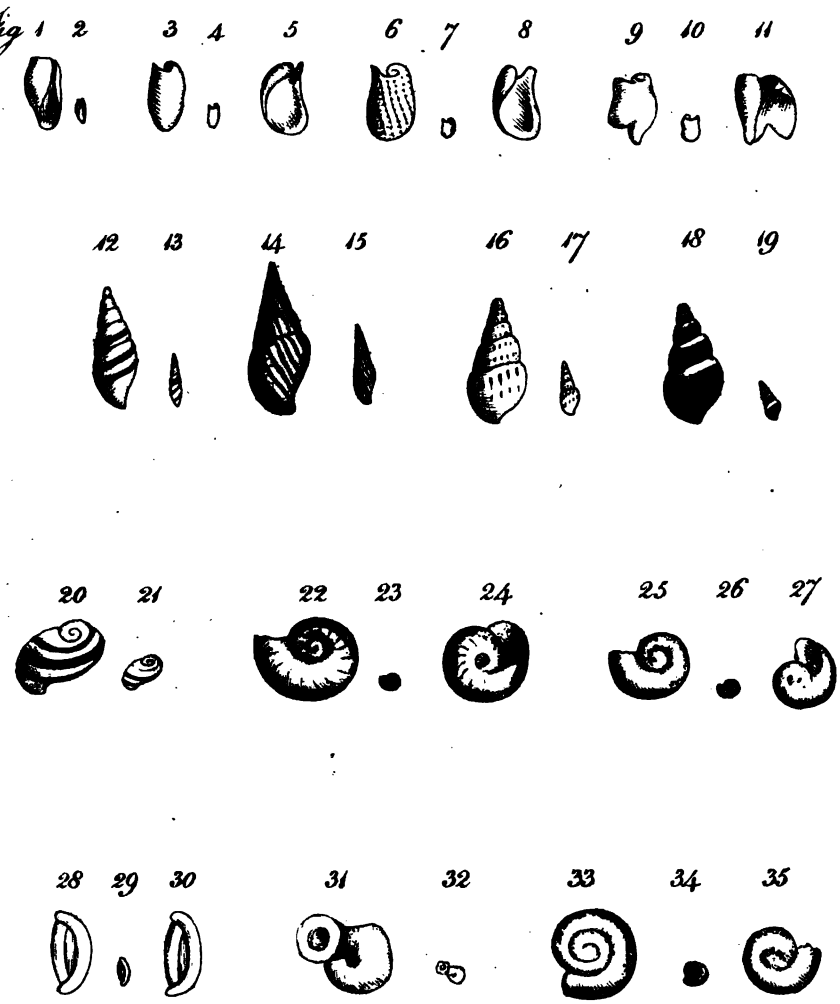
Obſ. Browniſh horn-colour.

EXPLANATION OF TAB. I.

Fig. 1. Bulla truncata, magnified.
2. ———, natural ſize.
3. Bulla denticulata, upper ſide magnified.
4. ———, natural ſize.
5. ———, under ſide magnified.
6. Bulla punctata, upper ſide magnified.
7. ———, natural ſize.
8. ———, under ſide magnified.
9. Bulla emarginata, upper ſide magnified.
10. ———, natural ſize.
11. ———, under ſide magnified.
12. Turbo trifaſciatus, magnified.
13. ———, natural ſize.
14. Turbo membranaceus, magnified.
15. ———, natural ſize.
16. Turbo interruptus, magnified.
17. ———, natural ſize.
18. Turbo ſubrufus, magnified.
19. ———, natural ſize.
20. Helix faſciata, magnified.
21. ———, natural ſize.

Fig. 22. Helix nitidissima, upper side magnified.
23. ———————, natural size.
24. ———————, under side magnified.
25. Helix bicolor, upper side magnified.
26. ———————, natural size.
27. ———————, under side magnified.
28. Serpula ovalis, upper side magnified.
29. ———————, natural size.
30. ———————, under side magnified.
31. Serpula reflexa, magnified.
32. ———————, natural size.
33. Serpula cornea, upper side magnified.
34. ———————, natural size.
35. ———————, under side magnified.

Linn Trans V. tab 1. f. 6.



II. *Deſcriptions of ſome Marine Animals found on the Coaſt of Wales. By the late John Adams, Eſq. F. L. S.*

Read February 6, 1798.

PHALANGIUM.

1. *groſſipes.* P. CORPORE minuto cylindrico, humeris tuberculato, pedibus longiſſimis. *Linn. Syſt. Nat. Ed.* 13. *p.* 1027.

Milford Haven.

Obſ. To the minute and accurate deſcription given in the *Syſtema Naturæ* I can have nothing to add, except that its colour is a dirty red.

2. *hirſutum.* P. corpore ſubplano decemangulo.

TAB. II. *fig.* 1, 2.

Milford Haven. Tenbigh.

Obſ. Body oval with ten angles, and marked with a tranſverſe band near the centre; antennæ ſerrated on the interior ſide; feet eight, hairy; tail cylindrical, obtuſe; colour paliſh brown; length $\frac{1}{3}$ inch.

ONISCUS.

1. *bidentatus.* O. abdomine nudo, caudâ obtuſiſſimâ, ſquamâ ultimâ bidentatâ.

TAB. II. *fig.* 3, 4.

Milford Haven.

Obſ. Length ½ inch; upper ſide marked with ſix tranſverſe rows of ochreous ſpots; ſcales ſeven, the laſt with two teeth, which readily diſtinguiſhes this ſpecies.

NEREIS.

1. *viridis.* N. viridis filiformis ſegmentis CXXX. *Linn. Syſt. Nat. Ed.* 13. *p.* 1086.

Amongſt young plants of the *Fucus pinnatifidus* at Tenbigh.

Obſ. Length 2¼ inches.

ACTINIA.

1. *maculata.* A. coralliflora, tentaculis numeroſiſſimis retractilibus brevibus albis.

Milford Haven, ſurrounding the apertures of deſerted ſhells of the *Murex deſpectus.*

Obſ. This beautiful ſpecies is longitudinally ſulcated, having the edges of the baſe crenated: the lower part is an obſcure red, and the upper part is tranſparent white marked with fine purple ſpots; the outer circumference of the aperture has a narrow ſtripe of pink. When expanded, the ſuperior diviſion

ſion of the body ſeems formed of fleſhy bars placed in a reticulated manner, and lined with a fine membrane. From perforated warts, placed without order on the outer coat, iſſued white filamentoſe ſubſtances variouſly twiſted together: I have obſerved a ſimilar body ejected from the mouths of all the ſpecies of this genus, which have fallen within my notice.

2. *ſenilis.* A. ſubcylindrica tranſversè rugoſa. *Linn. Syſt. Nat. Ed.* 13. *p.* 1088. *Baſter. ſubſ. t.* 13. *f.* 2. bona.
Rocks, Tenbigh.

Obſ. The ſpecimens I obſerved were ſmaller than as repreſented in the figure above quoted; but that remarkable ſoft hairy appearance ariſing from the ſlender form and number of the tentacula, which ſo readily diſtinguiſh it from its Britiſh congeners, is well pourtrayed. Colour white or pink; when at reſt, the exterior coat is ſmooth.

ASTERIAS.

1. *minuta.* A. corpore rotundo, radiis quinque tenuiſſimis hirſutis. *Penn. Br. Zool. v.* 4. *p.* 63. n. 61.
Tenbigh, rare.

Obſ. Body round, convex, brown, ſomewhat larger than the head of a common pin; rays hirſute, about three times the diameter of the body, white. When examined under a microſcope, the upper ſide appears marked with a tawny yellow ſpot in the form of a

pentagon, and the under ſide with a ſmall yellow cinquefoil. The body contains a yellowiſh juice. Rays jointed, and from either ſide of each joint proceed three oval pellucid pointed bodies, which cauſe its hirſute appearance.

2. *rubens.* A. ſtellata, radiis lanceolatis gibbis, undique aculeata. *Linn. Syſt. Nat. Ed.* 13. *p.* 1099. *Baſter. ſubſ. t.* 12. *f.* 1—6.

Not unfrequent in Milford Haven.

Obſ. Colour pale orange; diameter 14 inches.

3. *pectinata?* A. radiata, radiis duplicatis; ſuperioribus pinnatis, inferioribus filiformibus. *Linn. Syſt. Nat. p.* 1101.

A. decacnemos. *Pen. Br. Zool. v.* 4. *p.* 66. *t.* 33. *f.* 71. bona.

In Milford Haven, very common.

Obſ. Both the pinnated and ſimple rays in this ſingular ſpecies are cloſely jointed throughout, and from theſe articulations ariſes its flexibility. The pinnæ on the under ſide are furniſhed with hollow tubes, gradually decreaſing in ſize as they approach the end; from which proceed, at the will of the animal, ſmall filiform, tranſparent, flexible bodies, which are probably the organs of feeling: On ſeparating one of the pinnæ from the main ſtem, the fleſh was found to be compoſed entirely of ſmall opaque globes. The filiform rays (or perhaps more properly the *radicles*, ſince by them the animal attaches itſelf to any thing) are each terminated by an incurvated claw, reſembling in figure and evidently for the ſame purpoſe as the claws of birds. The body

body is covered on the upper ſide by five unequal valves. It is remarkable of this ſpecies, that it is furniſhed with *two* apertures, one at the confluence of the valves, the other in the largeſt valve; their poſition with reſpect to the centre is variable: the laſt may readily eſcape obſervation, except when the animal chooſes to elevate it above the plane of the valve. When fully expanded, the inſide appears clothed with a fine membrane longitudinally folded and revolute at its margin. Colour deep red.

Since the illuſtrious Mr. Pennant has not referred his A. *decacnemos* to the A. *pectinata* Linn. (though he has quoted Barrelier and the figure of Linckius, which are given by Linnæus as ſynonyms to his A. *pectinata*), I cannot but feel apprehenſive of having committed an error in conſidering them as the ſame ſpecies, and have conſequently affixed a mark of doubt to the Linnean reference; but ſince the ſpecific character given in the *Syſtema Naturæ* accords perfectly with numberleſs ſpecimens which I have examined, I truſt it will not be the cauſe of any confuſion to a Britiſh naturaliſt.

SERTULARIA.

1. *imbricata.* S. ſubramoſa, veſiculis ſubclavatis, ſurſùm inordinatè imbricatis.

TAB. II. *fig.* 5—11.

On the *Fucus nodoſus.* Milford Haven.

Obſ. This ſpecies ſeems moſt nearly allied to the S. *cedrina.*

drina. Linn. Syſt. Nat. Ed. 13. *p.* 1313. n. 28. *Pallaſ. Zooph. p.* 139. from which however it differs in the veſicles not ſurrounding the ſtem in any regular ſeries, and in their ſhape. Height, from one to three inches. Young ſhoots cloſely imbricated to their baſe, but older ones often naked: the ſmaller branches, which proceed from a main ſtem, have the veſicles placed bifariouſly, but at their apex they reſume the imbricated form.

TUBULARIA.

1. *flabelliformis.* T. tubulis parallelis faſciculatis; faſciculis radiatim diſpoſitis.

TAB. II. *fig.* 12, 13, 14.

On the *Conferva rubra.* Milford Haven.

Obſ. This minute coralline differs conſiderably from its Britiſh congeners in habit, but agrees with them in texture. Its origin is a ſimple cylindrical ſtem, affixed at its baſe, which is a little dilated to the ſtems of the Conferva: it ſoon, however, loſes this form, and very abruptly becomes dilated into a fan-ſhaped compreſſed body, from which proceed eight rays. Theſe rays, when examined under the firſt magnifier of Ellis's microſcope, appear compoſed of equal and perfectly cylindrical tubes. In ſome I obſerved a deep crimſon ſpot, which was probably a dead or torpid polype.

EXPLA-

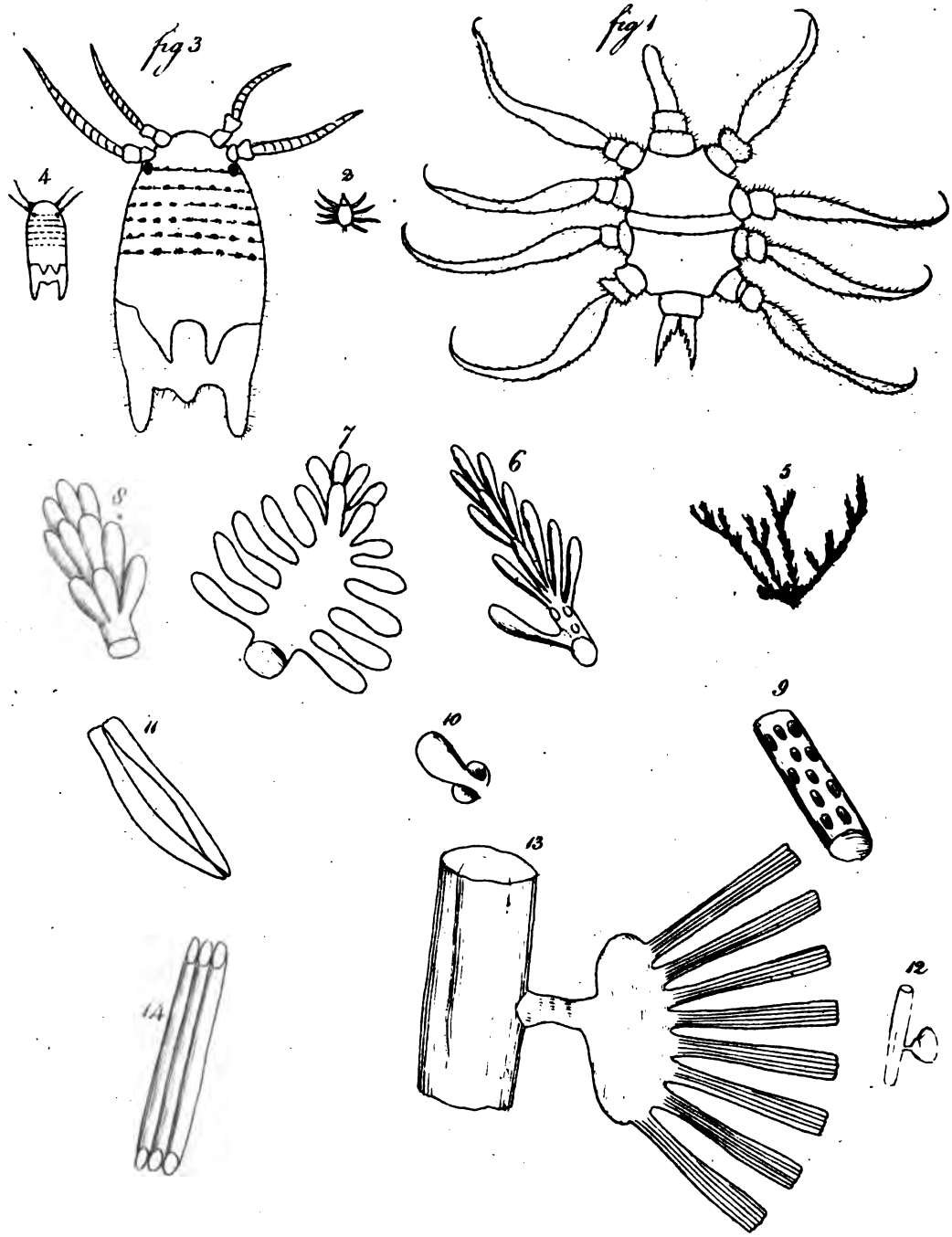


fig 3
fig 1
4
3
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EXPLANATION OF TAB. II.

Fig. 1. Phalangium hirſutum, magnified.
2. ———————, natural ſize.
3. Oniſcus bidentatus, magnified.
4. ———————, natural ſize.
5. Sertularia imbricata, natural ſize.
6. ———————, a branch, magnified.
7. ———————, a young branch, magnified.
8. ———————, a ſhoot from the baſe, magnified.
9. ———————, the ſtalk without the veſicles, magnified.
10. ———————, a young cell.
11. ———————, a polype in its cell.
12. Tubularia flabelliformis, natural ſize.
13. ———————, magnified.
14. ———————, tubes which compoſe the rays, magnified.

III. *Obſervations on the Economical Uſe of the Ranunculus aquatilis: with Introductory Remarks on the acrimonious and poiſonous Quality of ſome of the Engliſh Species of that Genus. By Richard Pulteney, M. D. F. R. S. and L. S.*

Read May 1, 1798.

BOTH antient and modern writers on Botany, and the *Materia Medica*, agree, pretty uniformly, in attributing to many ſpecies of the genus *Ranunculus* a corroſive and poiſonous quality. In ſeveral it abounds in ſuch a degree as, when applied externally, in a recent ſtate, to excite veſications, and ulceration of the parts, frequently of a malignant and gangrenous nature: and, when taken inwardly, to prove poiſonous and fatal, by inducing vomiting, inflammation of the ſtomach, with the uſual conſequences of *acrid* poiſons. Theſe qualities are particularly manifeſt in the recent plant, while in its higheſt vigour before flowering; and more intenſely in the germen of the flower itſelf, and in the petals of ſome.

The poiſonous ſpecies, that are indigenous, and common in England, are, the *Ranunculus Flammula*, or Leſſer Spearwort; *R. bulboſus*, bulbous rooted Crowfoot; *R. acris*, upright Crowfoot; *R. ſceleratus*, Marſh Crowfoot; *R. arvenſis*, Corn Crowfoot; and the *R. aquatilis*, or Water Crowfoot, according to the report of various authors. Of theſe the *Flammula*, *bulboſus*, and *ſceleratus*, are judged to be the moſt acrimonious.

Before

Before the introduction of *Cantharides*, the acrid *Ranunculi* were, all in their turn, uſed as veſicatories; and Haller tells us *, the *R. Flammula* is ſtill in uſe as ſuch in ſome parts of France. Gilibert aſſures us†, that the *R. bulboſus* veſicates with leſs pain than the *Flies*, and has no effect on the urinary paſſages. He gives it therefore a decided preference as an epiſpaſtic. Other authors allow theſe qualities in the *Ranunculi*, and that they are quicker than *Cantharides* in their veſicating effect; but ſay, that all theſe advantages are more than balanced, by the greater uncertainty of their action on the ſkin, and their frequently leaving ill-conditioned ulcers, of which Murray and other writers have recorded inſtances ‡. Nevertheleſs, the *Ranunculi* were employed in local ſpaſmodic complaints and in fixed pains, and not unfrequently in cataplaſms to the wriſts in intermitting fevers. *Crowfoot* is known alſo to have been one of the ingredients in Plunket's Epithem for Cancers.

The acrimony of theſe plants is, however, of ſo volatile a nature, that, even in the moſt virulent, it is wholly diſſipated in drying; ſo that, in the form of hay, they appear to be harmleſs, and nutritive to cattle. It is alſo inſtantly expelled in decoction, probably in all the ſpecies; at leaſt, Murray informs us, that the ſhepherds of Morlachia eat even the *R. ſceleratus*, as a culinary plant, after boiling it: the *R. auricomus*, and, as ſeveral authors aſſure us, the *R. repens*, are ſo deſtitute of acrimony as to be wholly inoffenſive, and even worthy of a place among oleraceous plants.

* See the *Enumeratio Stirpium* and *Hiſtoria Stirpium Helvetiæ*, in which much ſatisfactory information is collected, reſpecting the properties of this genus of plants; and for which the Author has, with his uſual candour and accuracy, quoted all his authorities.

† *Plantæ rariores Lithuaniæ*, No. 331.

‡ *Apparat. Medicam.* iii. 87.

The

The *Ranunculi* give out this quality wholly in diſtillation: the water of the *R. ſceleratus*, by the experiments of Tilebein, as recorded in the ſecond volume of the *Chemical Annals*, is acrimonious in an intenſe degree, and, when cold, depoſits cryſtals which are ſcarcely ſoluble in any menſtruum, and are of an inflammable nature*. The diſtilled water of the *R. Flammula*, or Leſſer Spearwort, as we are informed by Dr. Withering, is an emetic more inſtantaneous, and leſs offenſive during its action, than white vitriol; and, as if Nature had furniſhed an antidote to poiſon from among poiſons of its own tribe, is to be preferred in promoting the inſtant expulſion of deleterious ſubſtances from the ſtomach.

In the experiments of the *Pan Suecus*, even in the improved edition by Schreber, after the obſervations and renewed trials of Kalm, Gadd, Bergius, and Laſtbohm, made upon horned cattle, goats, ſheep, horſes and ſwine, all the ſpecies of *Ranunculi*, with which trials were made, except the *R. auricomus*, were rejected by the horned cattle; and it is well known, that while our meadows and paſtures are eaten bare of other vegetables, the *R. acris*, and *R. bulboſus*, which are but too plentiful, are left untouched: neither do cattle willingly eat the *R. repens*, although it is not wholly rejected by horſes, ſheep, and goats.

The *R. Flammula*, according to the above experiments, was eaten only by horſes, to which animal it is there ſaid to be very grateful; whereas the *R. auricomus*, eaten by all the reſt, (except that ſwine chooſe only the roots,) was rejected by horſes. The *R. ſceleratus*, which is ſuppoſed to be the *Herba Sardonia* of Dioſcorides, was touched by goats alone; the *R. bulboſus* only by the latter, though it is well known in England that hogs are fond of the roots. The *R. acris* was eaten by ſheep and goats; but the *R. aquatilis* is recorded as the only one re-

* Page 313.

jected by all the five ſpecies of animals, on which theſe trials were made. It does not appear by either edition of the *Pan Suecus*, that any trials were made with *R. arvenſis*; and though horned cattle and horſes will eat this ſpecies greedily, (although not without ſubſequent injury,) yet it is known to have been highly deleterious to ſheep. A notable inſtance of this occurred in Piedmont, in the year 1786, where a number of theſe animals died, as it was at firſt ſuppoſed, of an epidemical diſeaſe; but ſubſequent examination diſcovered, that this deſtruction was owing to the *Ranunculus arvenſis*. The hiſtory of this accident is circumſtantially related in the Memoirs of the Royal Academy of Turin, by M. Brugnon*. The herb grows luxuriantly in Piedmont, and the ſheep fed with much eagerneſs upon it. The effects here mentioned were not immediate, but progreſſive; and M. Brugnon, on further inveſtigation, was convinced they were principally owing to the roots of the plant; ſince by experiments purpoſely made on dogs, theſe animals were almoſt inſtantly killed by them. On the diſſection of the ſheep, all the four concoctive organs were found affected with eryſipelatous and gangrenous ſpots; but more particularly the *abomaſum*, which he found much more deeply ulcerated than the others; and the miſchief had extended into the ſmaller inteſtines.

The avidity with which ſheep, horſes, and cows, eat the *Ranunculus arvenſis*, is, as M. Brugnon juſtly obſerves, an exception to the commonly received maxim, that herbivorous animals are, by inſtinct, led to reject whatever is noxious. We ſee frequently, that hunger will impel our domeſticated cattle, eſpecially on being firſt turned to graſs in the Spring, to eat almoſt all vegetables promiſcuouſly:

* Memoires de L'Académie Royale des Sciences. Années 1788—1789, à Turin. 4to. 1790.

Some of our farmers are aware of the effects of *Crowfoot*, of which the *R. acris* and *R. bulboſus* are ſo common in our paſtures, and by which the mouths of their cattle are frequently inflamed and bliſtered; and doubtleſs the effects often extend much farther, and ſometimes prove fatal. There can be little doubt of the ſame deſtructive conſequences from other poiſonous plants, in caſes where the cauſe is little ſuſpected.

M. Krapf, who inſtituted a ſet of experiments wholly confined to this genus of plants*, attributes to the *R. aquatilis*, the deleterious qualities belonging to the others; obſerving, that it will veſicate the ſkin, but is ſlower in its operation than the *R. bulboſus* and *R. ſceleratus*. Biſhop Gunnerus alſo, in his *Flora Norvegica* †, tells us, that this ſpecies is not leſs noxious to cattle than the *R. ſceleratus*; that even the goat, an animal leſs nice in the ſelection of its food than the others, leaves it wholly untouched.

It is well known to botaniſts, that the *Ranunculus aquatilis* of Linnæus comprehends four ſpecies of the older writers; and even Haller, and ſome more modern authors, ſtill keep them ſeparate: among whom, the late Profeſſor Sibthorp, in his *Flora Oxonienſis*, enumerates them diſtinctly, under the names of 1. *R. heterophyllus*, or *R. aquatilis Ger. em.* 829. *Ray Syn.* 249. 2. *R. aquatilis*, or R. aquatilis omnino tenuifolius *J. B.* iii. 781. *Ray Syn.* 249. 3. *R. circinatus*, R. aquaticus albus, circinatis tenuiſſime diviſis foliis, floribus ex alis longis pediculis innixis *Pluk. alm.* 311. *t.* 55. 2. *Ray Syn.* 249. and 4. *R. fluviatilis*, or Ranunculo ſive Polyanthemo aquatili albo affine, Millefolium maratriphyllum fluitans. *J. B.* iii. 782. Without en-

* *C. Krapf*, Experimenta de nonnullorum Ranunculorum venenatâ qualitate, horum externo et interno uſu. *Viennæ*, 1766. 8vo. p. 107.

† No. 646.

tering

tering here into any diſquiſition relative to theſe diſtinctions of the ſpecies, I ſhall come to the ultimate object of theſe obſervations, by remarking, that I was lately witneſs to a fact, with reſpect to the *Ranunculus aquatilis fluviatilis*, which, after what I recollected of the character of the plant, ſomewhat ſurprized me, while it ſufficiently proved, not merely the innoxious quality of this plant, but that it is nutritive to cattle, and capable of being converted to uſeful purpoſes in agricultural economy. Unleſs theſe varieties of the *R. aquatilis* Linn. be endowed with different properties, it is a proof that the experiments on this plant were not made with ſufficient accuracy, or diſcrimination of the varieties; not ſufficiently repeated on different individuals of the ſame ſpecies of animals; or, that in different countries or ſituations it is diveſted of its virulence. In the preſent inſtance, it is probable, the plant is rendered inert as a poiſon, by growing in the water; although in certain other inſtances, moiſture is thought to heighten the deleterious property of vegetables, eſpecially in the umbelliferous tribe.

The fact that I have alluded to is, that in the neighbourhood of Ringwood, on the borders of the Avon, which affords this vegetable in great abundance all the year, ſome of the cottagers ſuſtain their cows, and even horſes, almoſt wholly by this plant; ſince the remaining part of their food is nothing more than a ſcanty pittance they get on the adjacent heath, which affords little more than *Ling*, *Lichen*, Bog-moſs or *Sphagnum*, &c. It is uſual to employ a man to collect a quantity for the day every morning, and bring it in the boat to the edge of the water, from which the cows, in the inſtance I ſaw, ſtood eating it with great avidity. I was indeed informed they reliſhed it ſo highly, that it was unſafe to allow them more than a certain quantity; I think between twenty-five and thirty pounds each, daily; but with variation according to circumſtances.

The cows I ſaw were apparently not in a mean condition, and gave a ſufficient quantity of good milk. I was told by the perſon whoſe cattle were feeding on it, that he kept five cows and one horſe ſo entirely by this plant, and what the heath afforded, that they had not conſumed more than half a ton of hay throughout the whole year; none being uſed, except when the river is frozen over. I examined the whole parcel, on which four cows were feeding, in the beginning of March; and found the whole conſiſted, excluſively, of the *Ranunculus fluviatilis*, without any mixture of the *Potamogeton*, *Carex*, *Sparganium*, or other aquatic plants. In Summer, however, it can ſcarcely be avoided but that there muſt be a mixture of ſome of theſe: but other plants are not choſen.

This account was confirmed to me by different perſons; by whom I was further informed, that hogs are alſo fed with the ſame plant, on which they improve ſo well, that it is not neceſſary to allow them other ſuſtenance, till it is proper to put them up to fatten.

This relation, while it ſhews how carefully experiments ſhould be conducted before a deciſive judgment on the powers of any reputedly poiſonous vegetable can be formed, may induce ſuch as were unacquainted with this fact, to adopt the uſe of this plant in ſimilar ſituations, ſince it is one of the moſt frequent in many rivers of this kingdom. The application of it to theſe uſeful purpoſes will alſo anſwer a ſecondary good, of tending to clear the ſtreams of what is otherwiſe conſidered as a noxious weed; ſince, by its abundance in Summer, it is frequently ſeen to choke up the rivers more than any other plant, and, from ſlight falls of rain, contributes much to the overflowing of meadows in hay-time.

IV. *Obſervations on preſerving Specimens of Plants.* *By John Stackhouſe, Eſq. F. L. S.*

Read October 2, 1798.

IN proſecuting my reſearches with a view to complete the hiſtory of the Britiſh *Fuci*, I was deſirous to diſcover, if poſſible, a method of preventing the olive-coloured, coriaceous ſpecies from turning black in drying. For this purpoſe I tried the experiment of immerſing them in a ſtrong ſolution of alum. The reſult of my experiment did not anſwer my expectation. They were prevented indeed from turning black, but they acquired a greeniſh hue. However, imagining this might ariſe from the mixture of aluminous with muriatic ſalts, and being of opinion that the properties of alum might be of great uſe in preſerving land plants on ſeveral accounts, I ſet on foot a courſe of experiments, and am happy to ſay that the reſult has been favourable to my expectations. After repeated trials, during which partial failures occurred, owing to the proportioning the degrees of ſtrength of the ſolution, and the admiſſion of light and air during the time of drying, I can ſafely recommend to the public attention the proceſs which follows, not doubting but that many improvements will ſuggeſt themſelves to thoſe who poſſeſs a chemical knowledge of the various ſubſtances made uſe of by dyers in fixing their colours.

Take a ſaturated ſolution of powdered alum in common water: immerſe carefully your ſpecimen, flowers, leaves and ſtalk, in this liquor.

liquor. During this immerſion, with a camel's-hair bruſh, ſuch as varniſhers make uſe of, wet thoroughly a ſheet of blotting-paper: diſplay your ſpecimen carefully on this paper, and prepare another ſheet in a ſimilar manner to lay over your plant. Then give a ſmart preſſure to your plant, either with a botanical preſs, a napkin preſs, or weights of any kind applied to the ſpecimen placed between ſmooth boards, or books, obſerving to lay about half a quire of paper below the ſpecimen, and the ſame quantity above, to take up the moiſture. After a day or two, according to the ſucculency of the plant, and when the aluminated paper appears perfectly dry, your ſpecimen may be removed into freſh paper, and kept carefully under gentle preſſure, with the edges of the paper folded over each other to prevent every poſſible admiſſion of light and air, till its removal into the herbarium. For thoſe who wiſh to affix their ſpecimens (and it is ſcarcely poſſible to effect the preſervation of the delicate tints of the petals of many kinds without a ſtrong adheſion to, and almoſt incorporation with the paper), the time abovementioned, that is, when the aluminated paper is thoroughly dry, is the proper time for proceeding with the operation. Have ready a paſte made with flour and water, with alum mixed in it, ſuch as upholſterers uſe, ſtrong gum-water, or iſinglaſs-glue: apply either of theſe to the back of your ſpecimen with a bruſh; then fix it carefully on ſtrong writing or drawing paper, by laying your paper ſmoothly on the ſpecimen as it lies, preſſing it gently with your hands and a cloth, and then turning over both together. When this is done, iron the plant with a box-heater in the manner recommended by Major Velley in Dr. Withering's *Arrangement of Britiſh Plants*, *v.* 1. *p.* 34. if you have the conveniencies; if not, apply an immediate and ſmart preſſure, as before directed.

It is taken for granted that thoſe who wiſh to profit by theſe inſtructions,

inſtructions, are practiſed in the uſual methods of preſerving dry ſpecimens, and that they are aware that particular care ſhould be taken to pare off the back parts of thick woody ſtalks, and of the globoſe, ſucculent heads of flowers, as well as of the buds of thoſe intended to be paſted down, previous to their preſſure. For the moſt ſatisfactory information on theſe particulars, the reader is referred to the Introduction to Dr. Withering's excellent work abovementioned. It is almoſt needleſs to mention, that aluminated ſpecimens will be completely guarded from the eroſion of inſects, as well as from the danger of being injured by damps; and therefore the proceſs will be particularly valuable to thoſe who viſit foreign countries.

As beauty and durability are of ſo much conſequence in the arrangement of an herbarium, and as plants cannot be preſerved any length of time in perfection even with the uſual apparatus of a *vaſculum*, or tin-caſe, no botanical traveller ſhould be without a ſmall preſs, ſuch as that deſcribed in Dr. Withering's *Arrangement*, *v.* 1. *p.* 31. It may be framed ſo as to admit of a drawer for receiving the preſerved ſpecimens; either thin enough to lie under the feet in a poſt-chaiſe; or, as a ſeat for a third perſon is often deſirable, it may be contrived to be as high as the ſeat of the carriage, with a correſponding cuſhion on the top.

V. *On the Aſcarides diſcovered in the Pelecanus Carbo and P. criſtatus. By Richard Pulteney, M. D. F. R. S. and L. S.*

Read November 6, 1798.

THE liberty I now take of troubling the Society, with what may appear to many a trifling object, is, however, one among many other proofs of the utility of its inſtitution; as affording a repoſitory, or centre of communication, always open for the reception of detached tracts in Natural Hiſtory; which, if deemed of ſmall importance in ſuch inſtances as the preſent, is more than balanced by the utility of others that might be entirely buried in oblivion, for want of a ready and convenient mode of introduction to the public, without the obligation of writing a formal diſſertation which perhaps neither time, nor want of proper aid by acceſs to books, may allow.—In that ſituation I now wiſh to be regarded, and indulged, by this Society.

Having lately heard a gentleman, remarkable for his ſkill as a ſportſman, and not leſs curious in his obſervations, relate that he had more than once, on opening the crop of the Corvorant (*Pelecanus Carbo*, Linn.), found a large quantity of worms in it, I engaged him to ſend me a few. He informed me, that they lay coiled together into a ball or congeries (as I believe is uſually the caſe) of a large ſize, in ſome equal to that of an egg. It was not, however, from the *Corvorant* only, but from the *Shag* alſo, that theſe worms were taken. They were promiſcuouſly put into a phial, and do not

appear to differ. In the recent ſtate they were of a browniſh-yellow caſt, having loſt much of the colour ſince they were put into the brandy and water. This gentleman, and the party with him, killed at the time upwards of twenty of theſe birds, in every one of which worms of this kind were found; and, what appears worthy of attention, is, that they were diſcovered, together with ſmall pebbles, and fragments of wood, in the crops of *young Shags*, that had never been out of the neſt.

A few of theſe animals will be preſented to the Society with this paper, and I think it will appear that they are all of the kind called *Aſcarides*, the ſpecies of which, or at leaſt the different ſpecies of animals in which the ſame is found, have been diſcovered, of late years, to be greatly more numerous than was formerly known; obſervations relating to worms in the inteſtines of animals having been almoſt wholly confined to thoſe found in the human ſpecies.

Linnæus deſcribes only two *Aſcarides*, for the characters of which I need only refer to the *Syſtema Naturæ*. It is to the diſcoveries of later authors that we owe the knowledge of a much greater number, and find them now inhabiting a great variety of ſubjects throughout the different claſſes of the animal kingdom. It is well known that Redi was the firſt writer who augmented the knowledge left us by the Antients, or who extended enquiries on the ſubject of *Animalcula* which infeſt the bodies of living animals. He mentions the *Aſcarides* of the Eagle, the Raven, the Swan, the Crane, and of ſeveral others*. After his time, ſcattered obſervations only were recorded, and many years intervened before any conſiderable advances were made in this branch of ſcience, howſoever cloſely connected with the well-being of mankind.

* *Fr. Redi*, de Animalculis vivis, quæ in Corporibus Animalium vivorum reperiuntur, Obſervationes. *Amſtelod.* 1708. 12mo.

Among the more modern publications, that of M. Pallas unqueſtionably holds a diſtinguiſhed rank. His *Theſis de infeſtis viventibus intra viventia*, printed at Leyden in 1760, is an elaborate diſquiſition on this ſubject, and is worthy of being particularly noticed, as containing not only very complete deſcriptions and ſpecific differences of worms infeſting the body of man, but alſo a collected ſeries of the moſt uſeful knowledge of preceding writers, with the various modes of extirpating theſe pernicious inmates.

To the almoſt unparalleled induſtry of Otto Frederic Müller the greateſt merit is due, for his accurate deſcription of the *Helminthic* order: and, probably, we owe to the Royal Society of Copenhagen, two publications which have ſince ſo much extended the knowledge of the preſent day, on the ſubject of my paper. The *Premium*, of which I give the title below *, held forth by this Society, excited the diligence of M. Bloch of Berlin, and M. Goeze, to both of whom prizes were aſſigned. M. Bloch publiſhed his Diſſertation, which was tranſlated into French, under the title below recited †; the latter publiſhed a Deſcription of the ſame animals, in quarto, *p.* 471. in the German language, with 44 plates. Gmelin, in his enlarged edition of the *Syſtema Naturæ*, has enumerated ſeventy-eight ſpecies of *Aſcarides*, having arranged them according to the claſſes of animals in which they exiſt; of which, twenty-four ſpecies of birds are found to be infeſted with theſe worms. Thoſe I now ſend are an addition to that number. M. Goeze alone, from references to his work in Gmelin, appears to have deſcribed upwards of twenty

* An, Seminium vermium inteſtinalium, Teniæ, Gordii, Aſcaridis, Faſciolæ, &c. animalibus connatum; an, ab extus intromiſſum; obſervationibus, et argumentis probare remediaque in illo caſu recenſere.

† Traité de la Generation des Vers des Inteſtines et des Vermifuges. *Straſburgh*, 1788. 8vo. *p.* 127. *tab.* x. firſt printed in German at Berlin in 1782.

Aſcarides

Ascarides before unnoticed; exclusive of nine or ten kinds of the newly-named genus *Echinorynchus*, so nearly allied to the *ascaris*, as to be heretofore classed under the same name.

From this general view of this subject, there is little room to doubt, that *Ascarides* exist in a variety of other animals as yet unexamined: and although Gmelin does not refer any to the class of insects, I am assured by my friend Aylmer B. Lambert, Esq. that he saw a living worm crushed out of the body of the *Carabus hortensis*.

VI. *Obſervations on the Orcheſton long Graſs. By William George Maton, M. B. F. L. S.*

Read December 4, 1798.

IT muſt have been a matter of much ſurprize to many beſides myſelf, reflecting how long the Orcheſton graſs has been known, and how frequent the opportunities have been for a full and accurate examination of it by botaniſts and agriculturiſts, that its hiſtory was ſo very contradictory and incomplete. It was not until I viſited the meadow, and paid conſiderable attention to its produce, that I diſcovered the cauſe of this. The fact is, that the graſs was examined by the different perſons who have written upon the ſubject of it at very different ſeaſons of the year, and each taking it for granted that it was a peculiar ſpecies, or at any rate a peculiar variety of ſome one ſpecies, made his report on that one only which chanced to be in its perfection at the period of his inſpection. Hence one gentleman, who viſited the ſpot about the latter end of July, pronounces the Orcheſton graſs to be excluſively *Agroſtis ſtolonifera**. Another, happening to obtain his ſpecimens earlier in the year, ſays, that *Poa trivialis* is the ſpecies†. Another obſerver, bearing ſtedfaſtly in mind that it has been deſcribed as a *peculiar* graſs, increaſes the uncertainty, by declaring that, "by all the enquiries he has made, he has not found that this ſpecies of graſs

* See *Memoirs of the Bath Society*, vol. i. p. 93.

† *Withering's Bot. Arr. of Britiſh Plants*, vol. ii. p. 144.

grows

grows in any other part of the kingdom*." This laſt opinion indeed has been moſt general, and it evidently originated from the account given of it in the *Indiculus Plantarum dub.* into which it was copied from Merret's *Pinax*, or at leaſt from How's *Phytologia Britannica*, (printed in 1650,) where is the earlieſt mention of this phenomenon in vegetation that I can find, and it is deſcribed as "*Gramen caninum, ſupinum, longiſſimum, non deſcriptum.*" Merret, however, remarked, in addition, that it was found in ſome parts of Wales. I apprehend that Ray never ſaw it. But I am at length ſatisfied that the long graſs of Orcheſton is not only not a ſpecies peculiar to the ſpot, but that it is compoſed of moſt of the ſpecies which grow in other meadows.

The meadow producing the graſs which has excited ſo much curioſity is ſituated in the loweſt part of a very narrow winding valley †, ſheltered on each ſide by gradual but by no means lofty acclivities of chalk. This valley forms a channel for the frequent floods which come down from Tilſhead (about three miles diſtant) in the Winter ſeaſon; and, from the meadow alluded to being the loweſt of the range, in regard to level, the water reſts there to ſome depth, if it does any where, and indeed the place is rarely otherwiſe than ſwampy throughout the year. There is one ſpring not half a mile diſtant, and therefore the water by which the meadow is often ſubmerged, may at firſt be of a higher temperature than the ſurrounding atmoſphere. The earlier the ſprings ſwell, the more plentiful is the ſucceeding crop of graſs. This circumſtance has conſtantly

* *Memoirs of the Bath Society*, vol. i. p. 95.

† Dr. Withering is incorrect in calling the diſtance of Orcheſton St. Mary from Saliſbury 19 miles; it is certainly not more than 11. The meadow is about half a mile from the village of Shrewton. It is at preſent rented by Farmer Sheats, of Orcheſton St. George.

been

been remarked by the neighbouring inhabitants. A bed of ſmall looſe pebbles, which are all of a ſiliceous nature, with a ſcanty covering of mould formed from the decompoſed relics of former vegetable generations, conſtitutes the immediate ſoil.

My laſt viſit to Orcheſton St. Mary was on the 15th of Auguſt laſt. I at that time found the following graſſes growing in the meadow, viz. *Holcus lanatus*, *Lolium perenne*, and *Agroſtis ſtolonifera*. All theſe were pretty nearly of the ſame length, meaſuring about ſeven feet. They uſually riſe, I underſtand, about 16 or 17 inches before they fall and run along the ground in knots, which knots ſend forth ſhoots into the interſtices of the pebbles. Moſt meadow graſſes ſo circumſtanced with reſpect to ſoil would probably become knotted. In June, *Triticum repens*, *Avena elatior*, *Alopecurus pratenſis*, and *Poa trivialis* (*paluſtris*, of Hudſon), are ſeen thriving ſimilarly to thoſe ſpecies above mentioned. I have ſpecimens of the laſt, which meaſure nearly ten feet in length. Some of the ſpikes of *Triticum repens* have between forty and fifty *glumæ*. Even *Conium maculatum*, growing in the ſurrounding hedges, reaches the height of ſeven or eight feet. Beſides graſſes, I have found in this remarkable meadow *Symphytum officinale*, *Convolvulus arvenſis*, *Potentilla reptans*, *Ranunculus pratenſis*, and *Oenanthe crocata*, all unuſually ſtrong and ſucculent, and ſtrikingly tall.

The crops of the Orcheſton graſs within late years have not by any means equalled what they have heretofore been. Perhaps the gradual deepening of the mould may be the cauſe of this, as it muſt deprive the crop more and more of the advantage ariſing from the diſpoſition of the pebbles, which (if I might venture a conjecture) ſeems to be a very important peculiarity in the ſituation. It is certain that the ſpace of only two acres and an half *has* yielded as much as ten tons of hay in one year. The firſt crop has uſually been cut about

about the end of May, and the ſecond in July, or (which is rare) as late as the end of Auguſt. The tithes of the meadow have been rented more than once for 5*l.* the produce amounting to 25 hundred weight of hay.

The herbage of the adjoining meadows, I have remarked, is very exuberant; and this exuberance may be traced increaſing or declining according as the ſoil varies more or leſs from that of the principal meadow.

At the diſtance of a mile or two miles from Orcheſton, but in the ſame valley, ſome of the graſſes may be ſeen to put on an uncommon luxuriancy; and I have no doubt that, in proportion as meadows in other parts of the kingdom approach more nearly in circumſtances and ſituation to that of Orcheſton, the more ſimilar their produce will be found.

VII. *Deſcription of a new Species of Myctéria. By George Shaw, M. D. F. R. S. V. P. L. S.*

Read December 4, 1798.

THE following is a deſcription of a ſpecies of *Myctéria* or *Jabiru*, the ſkin of which was tranſmitted to me for examination by the Rev. Mr. Rackett, F. L. S. who received it from Mr. Bryer, of Weymouth.

It is ſaid to be a native of Senegal. The length, from the tip of the bill to the ends of the claws, was ſix feet, two inches. The bill was thirteen inches in length, which is alſo the meaſure of that of the common Jabiru. The neck was fifteen inches. The body twelve inches. The naked part of the thigh eleven inches; the feathered or fleſhy part four inches. The knee-joint one inch. The leg thirteen inches and a half. The foot, to the tip of the middle toe five inches and a half. The two outſide toes are about an inch ſhorter than the middle one. The back toe ſcarcely quite two inches. A very ſlight approach towards a ſemipalmated appearance takes place at the firſt joint: the claws are ſmall and blunt. The bill is pale or whitiſh at the baſe for near three inches from the ſetting on of the upper mandible, and one inch and a half from the lower: then ſucceeds a broad black zone acroſs both mandibles, about three inches wide; well defined on the back part, but ſomewhat irregular in front. From this part the bill is pale, with a ſlight caſt of reddiſh for about two inches, and from thence grows intenſely red or of a vermilion colour to the tip. On each ſide the

upper mandible is a large ſemi-oval and ſemitranſparent ſpace, which, at its back part, is continued upwards in a curved direction acroſs the fore part of the eye. A little way down the upper part of the bill runs a bare flattened part, ſomewhat in the manner of the cere in the *Fulicæ* and other birds of that tribe. The whole head and neck are black, and covered with feathers, which, on the head, ſeem to have been ſmall and ſemi-ſetoſe on the front, but ſomewhat longer and larger on the occiput. Thoſe on the neck are ovate-lanceolate and of the uſual ſtructure, or as in the generality of birds. The plumage of the breaſt, back, thighs, &c. are alſo of the uſual ſtructure, but much more inclining to a rounded than lanceolate form. The wings were wanting: the ſhoulders alone remaining, for about the length of four inches; they were covered with white feathers. The ſcapulars, which were left on each ſide, were black, with whitiſh baſes: they were about fifteen inches in length. The whole remainder of the bird was white. The tail was entirely wanting. Beneath the baſe of the bill, on the ſkinny or gular part, were ſituated two very ſmall pear-ſhaped, pendant wattles, adhering by very ſmall necks: they were ſeated at about three quarters of an inch from each other, and in the dried ſpecimen were of a ſubſtance reſembling iſinglaſs. The legs are extremely long, and the thighs, to a diſtance nearly equal to that of the leg itſelf, are quite bare. The whole leg and thigh of a black colour, except that round the knee, as well as round each joint of the toes, is a pale band or zone. The whole length of the leg and thigh is coated with hexagonally-longitudinal ſcales or diviſions.

If this bird be collated with the deſcriptions of the *Mycteria Americana* or Common Jabiru, it will clearly appear to be a diſtinct ſpecies. It approaches much more nearly to the *Mycteria Auſtralis* or New Holland Jabiru, but, in that bird, there is not the ſlighteſt

appearance of the membranaceous or ſemitranſparent part on each ſide of the upper mandible. The colours alſo both of the bill and legs are widely different from thoſe of the New Holland Jabiru; but it agrees with that ſpecies in having the head and neck covered with feathers. Of the New Holland ſpecies a beautiful ſpecimen may be ſeen in the Leverian Muſeum, which, however, ſeems not to have quite attained to its full ſize, ſince it falls ſhort of the meaſurements marked in ſome drawings executed in New Holland from the recent bird.

In order to elucidate as much as poſſible this curious genus, I ſhall conclude with giving the ſpecific characters of all the three birds above mentioned. It is to be obſerved, that in the *Syſtema Naturæ* no ſpecific character is given of the *Mycteria Americana* or Common Jabiru; that being then the only ſpecies known to exiſt. It is now neceſſary to form one for that ſpecies; viz.

1. MYCTERIA *Americana.*

M. alba, capite colloque nudis nigris, zona colli inferioris rubra, occipite albido, roſtro pedibuſque nigris.

American Jabiru.

White Jabiru, with the head and neck naked and black; a red zone round the lower part of the neck; the occiput whitiſh; the bill and legs black.

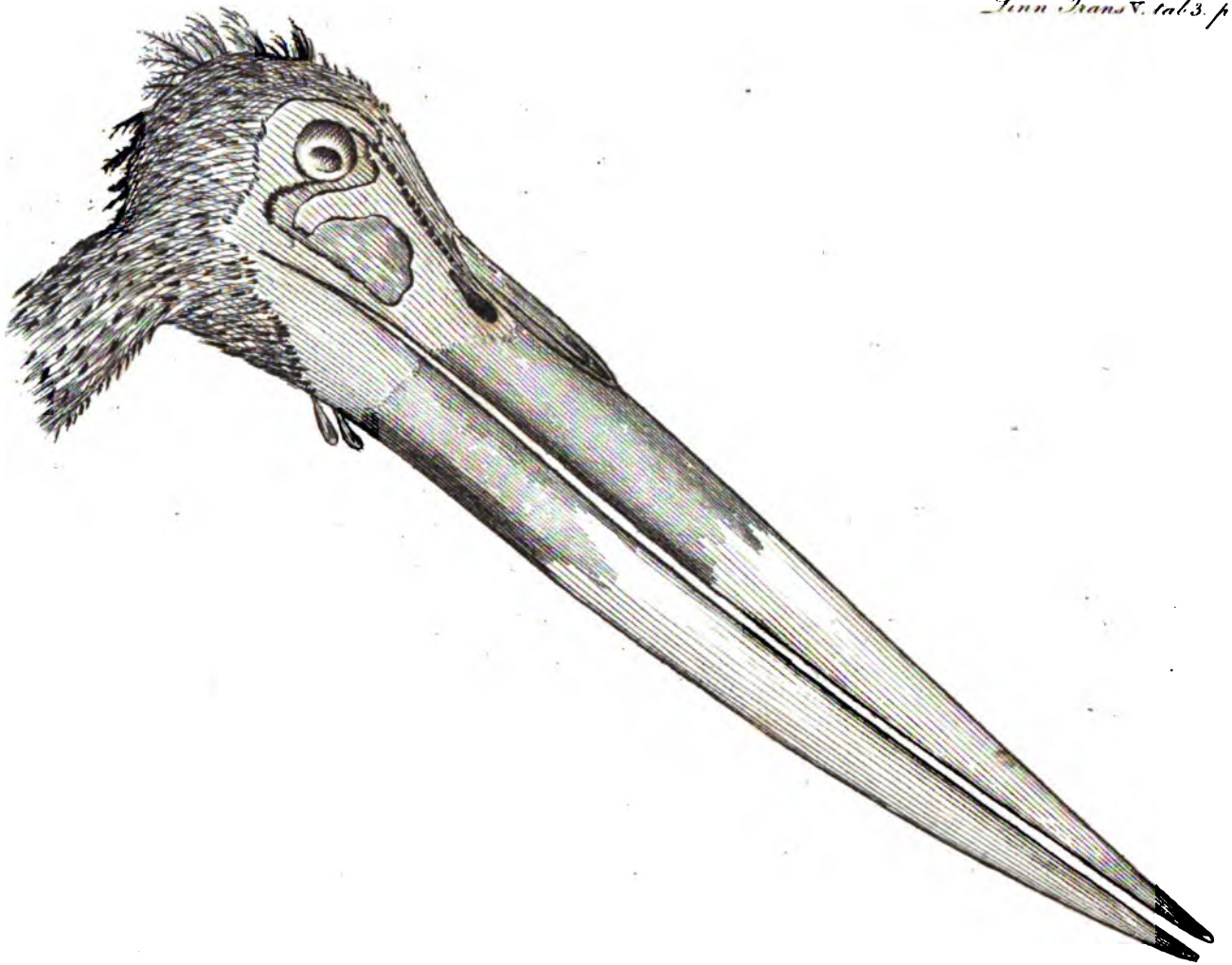
2. MYCTERIA *Auſtralis.*

M. alba, capite colloque viridi-nigris; tectricibus, pennis ſcapularibus caudaque nigris; roſtro nigro, pedibus rubris.

New Holland Jabiru.

White Jabiru, with the head and neck green-black; the coverts, ſcapulars, and tail black; the bill black, the legs red.

3. MYCTERIA



Linn Trans V. tab 3. p 35.

3. MYCTERIA *Senegalenſis.*

M. alba, roſtro apicem verſus rubro, baſin verſus albido faſcia nigra, macula utrinque feneſtrata.

Senegal Jabiru.

White Jabiru, with the bill red towards the tip, whitiſh towards the baſe, with a black tranſverſe band, and a tranſparent ſpot on each ſide.

I have added a repreſentation of the head of this ſpecies, half its natural ſize. TAB. III.

VIII. *A Supplement to the Plantæ Eboracenſes printed in the Second Volume of theſe Tranſactions. By Robert Teeſdale, Eſq. F. L. S.*

Read December 4, 1798.

THE Linnean Society having honoured with a place in the Second Volume of their Tranſactions, p. 103, a paper entitled, *Plantæ Eboracenſes*, I now beg leave to lay before them, as an addition to that paper, the following catalogue of Yorkſhire plants: the former liſt was confined to a ſmall part of the county, this is extended to the whole, that is, ſo far as my own obſervations, and the communications of my botanical friends, have enabled me; to which is added, ſuch of the more rare plants as have not fallen under our obſervation, but are mentioned, as natives of the county, by Ray, Dillenius, Hudſon, Smith, Dickſon, and Withering.

Plants that are found in every part of our iſland are generally omitted, as they were in my former paper, excepting thoſe of the Cryptogamia claſs.

It would be preſumption in me to ſuppoſe that this liſt, and my former one, contain any thing like a complete Flora of ſo extenſive a county; however I flatter myſelf the Society will do me the honour to accept of my efforts towards it, and wiſh they may be the means of exciting others of ſuperior talents, to finiſh what I have only made a beginning of.

My two catalogues, including the common plants omitted, contain

tain about nine hundred and ten ſpecies*, excluſive of the Cryptogamia; and of theſe enumerated, though ſeveral extenſive genera are left out, there are about four hundred and fifty.

I have travelled over, and ſcrutinized, at different times, the greater part of the county; and the part which is celebrated for the more rare plants, that is, Ingleborough Hill, and its neighbourhood, has been viſited by almoſt all the curious botaniſts of the laſt and preſent age; notwithſtanding, many plants may yet remain undiſcovered, as it is well known by every practical botaniſt, that the more rare ones are extremely local, and of courſe are frequently overlooked by the moſt accurate obſervers. In fact, the botanizing of mountains is a laborious buſineſs; and they can only be minutely examined by perſons who are nearly reſident, as their viſits ſhould be frequent, and at all ſeaſons of the year.

The learned Dr. Goodenough having, in his excellent paper on the Britiſh ſpecies of *Carex*, changed ſome of their trivial names, and added ſome new ſpecies, it was preſumed it would be the moſt eligible to inſert in this paper, with the Doctor's names, the whole of thoſe which we have met with in the county, although the greater part of them are contained in my other paper: the ſame kind of repetition is likewiſe made in the *Polytricha*, having now adopted the names of the ingenious Mr. Menzies in that genus.

Turnham Green, Dec. 3d, 1798.

> ——————O Jehova,
> Quam ampla ſunt tua opera!
> Quam ſapienter ea feciſti!
> Quam plena eſt terra poſſeſſione tua!
>
> DAVID, *Pſalm* 104. *v.* 24.

* Sibthorp's *Flora Oxonienſis* contains 734 plants; and Relhan's *Flora Cantabrigienſis* contains 795, excluſive of the Cryptogamia.

TRIAN-

TRIANDRIA MONOGYNIA.

Crocus ſativus - - - *Hudſ.* 13. *With.* 68.
About Halifax. Rev. Mr. Wood. in *With.*

Valeriana rubra - - *Hudſ.* 12. *With.* 65.
Old walls, in various towns; probably as much a native of Yorkſhire as any other county.

Schoenus fuſcus? - - β. albus. *Hudſ.* 16. *With.* 80.
Bogs near Turington, growing among the S. albus; rare.

Scirpus pauciflorus - *With.* 74.
Houghton-moor, near Newbold, in the Eaſt-riding. Marſhes, near Beverley. It is not an uncommon plant.

maritimus - *Hudſ.* 21. *With.* 77.
Ditches, and in the Lake at Hornſea. Near Hull abundantly.

Eriophorum polyſtachion *With.* 72. *Leers t.* 1. *f.* 5.
Bogs. Wet meadows and paſtures, in many parts of the county. Near Beverley.

Mr. Dickſon was the firſt of our Britiſh authors who pointed out the diſtinctions between this and the E. anguſtifolium, in Tranſ. Linn. Soc. vol. 2. p. 289.

Obſ. I have frequently found plants of this genus, ſome hermaphrodite, and others dioicous; and in a more forward ſtate of their growth, I have obſerved ſome with long,

long, and others with ſhort down. It is probable there may be another ſpecies.

DIGYNIA.

Alopecurus bulboſus - β. geniculatus. *Hudſ.* 27. *With.* 120.
Places where water ſtands in the Winter. Near Hull.

Agroſtis pumila - - *Lightf. Frontiſpiece, vol.* 2.
Heaths near Harrowgate.

maritima - *With.* 132.
Sea-ſide. Bridlington Quay.

Aira montana - - β. ſetacea. *Hudſ.* 35.
Houghton-moor.

cæſpitoſa - - Var. 2. vivipera. *With.* 136.
Mountains in the Weſt-riding.
This always continues the ſame under cultivation.

Feſtuca loliacea - - *With.* 157.
Meadows. Near Beverley.

rubra - - *Hudſ.* 45. *With.* 153. *Leers t.* 8. *f.* 1.
Heaths. Dry Paſtures. Flamborough Head.

myurus - - *Hudſ.* 46. *With.* 151. *Leers t.* 3. *f.* 5.
On walls. Beverley.

Bromoides - *Hudſ.* 46. *With.* 151.
Turf walls. Dry Banks. On the Wolds.

dumetorum - *With.* 154.
Meadows. Sides of hedges. Rare.

Poa

Poa maritima - - *Hudſ.* 42. *With.* 147.
Hornſea. Banks of the Humber at Hull.

diſtans - - - *With.* 141. *t.* 25.
Yorkſhire. *Withering.*

glauca - - - β. pratenſis. *Hudſ.* *With.* 148.
Ingleborough Hill, and other mountains.

vivipara - - - γ. pratenſis. *Hudſ.*
Ingleborough and other hills.

nemoralis - - *With.* 146. β. anguſtifolia. *Hudſ.*
On walls, adjoining to woods, at Caſtle-Howard.

criſtata - - *With.* 145. Aira criſtata. *Linn.* *Hudſ.* 33.
Sandy heaths, and paſtures.

Melica montana - - *Hudſ.* 37. M. nutans. *With.* 138.
Woods, about Settle and Ingleton.

Arundo arenaria - *Hudſ.* 54. Calamagroſtis arenaria. *With.* 123.
Hornſea. Bridlington Quay.

Elymus arenarius - *Hudſ.* 56. *With.* 170.
In the Sands at Hornſea, and Bridlington Quay.

Obſ. We have two varieties of this; one very glaucous, which is not ſo tall nor large as the other which is leſs glaucous.

Seſleria cœrulea - - *With.* 140. Cynoſurus cœruleus. *Hudſ.* 59.
Limeſtone rocks. Ingleborough. Settle. Ingleton.

Triticum junceum - *Hudſ.* 58. *With.* 173.
Sea-ſide, Hornſea.

β junceum. *Hudſ.* With the above.

Triticum loliaceum - *Eng. Bot.* 221. Triticum maritimum. *With.* Poa loliacea. *Hudſ.* 43.
Sea-ſhore. Not common.

Lolium arvenſe - - *With.* 168.
Walkington fields. Near Beverley.

Bromus ſecalinus - *Smith in Tranſ. Linn. Soc. vol.* 4. *p.* 281.
Corn-fields at Bulmer. Market Weighton. Near York.

racemoſus - Meadows at Beverley.
I have a variety much ſmaller in the whole habit; the upper part of the ſtraw and panicle are purple. It grows in wet marſhes near Beverley, and is the only ſpecies of the genus I ever obſerved in that kind of ſituation. I ſhewed my ſpecimens of this plant to the learned Dr. Smith, who informed me, they were the true B. racemoſus of Linnæus.

arvenſis - - Corn-fields at Little Weighton, amongſt wheat, where it was ſix feet high. ⊙ VII.
Obſ. This is rare. What I have named B. arvenſis in my former paper, were ſome large plants of the B. racemoſus.

erectus - - Wolds. Very common; ſome meadows near Newbold, almoſt wholly of it.
Obſ. The yellow, or orange-coloured Anthera, diſtinguiſhes this from all its congeners.

TETRANDRIA MONOGYNIA.

Dipſacus piloſus - - *Hudſ.* 61. *With.* 182.
Woods near Beverley. Colonel Machell. Various places in the North-riding.

Centunculus minimus *Hudſ.* 63. *With.* 198.
Houghton-moor, the ſide next to Newbold. I have not heard of this being found in any other part of the county.

Plantago maritima - γ. *Hudſ.* 64.
Mountains near Settle.

Galium erectum - - *Hudſ.* 68. *With.* 189.
Moiſt meadows and paſtures near Helmſley. Rare.

puſillum - - Near Leckonfield. Rare.

montanum - *With.* 187. *t.* 28.
Walkington Wood, near Beverley.

anglicum - *Hudſ.* 69. *With.* 191.
Near Boynton, the Seat of Sir George Strickland, Bart. Mr. Knowlton, F.L.S.

Alchemilla alpina - *Hudſ.* 71. *With.* 205.
Mountains in Yorkſhire. *R. Syn.*

TETRAGYNIA.

Sagina apetala - - *With.* 216. β. procumbens. *Hudſ.* 73.
Corn-fields. On walls.

Potamogeton marinum *Hudſ.* 76.
Ditches at the garriſon at Hull.

marinum *Vaill. t.* 32. *f.* 3.
Ditches near the ſea at Hornſea.

Obſ.

Obſ. I take this to be very different from the common P. marinum. Vaillant's figure is a good repreſentation.

Potamogeton paluſtre - foliis inferioribus ſubmerſis lanceolatis membranaceis ſeſſilibus, ſuperioribus ovali-lanceolatis petiolatis coriaceis natantibus.

Ditches near Beverley.

Obſ. This has generally been taken for a var. of the P. natans.

PENTANDRIA MONOGYNIA.

Anchuſa ſempervirens - *Hudſ.* 80. *With.* 227.

By the road between Settle and Ingleton.

Primula elatior - - *With.* 234. β. vulgaris. *Hudſ.* 84.

Under hedges—Sides of woods, not very common.

Convolvulus Soldanella *Hudſ.* 89. *With.* 240.

Owthorn, on the Holderneſs coaſt, where it has been found by Henry Grimſton, Eſq. F. L. S.

Lyſimachia thyrſiflora - *Hudſ.* 86. *With.* 237.

In the Eaſt-riding. *Ray's Syn.*

I could not find it, but it may poſſibly be there, as there are large tracts of marſh lands, the kind of ſituation it is ſaid to prefer.

Polemonium cœruleum *Hudſ.* 89. *With.* 241. *Eng. Bot.* 14.
Near Settle. Ingleton. Malham Cove.

Ribes alpinum - - *Hudſ.* 99. *With.* 264.
On the walls of Fountains Abbey.

Ribes ſpicatum - - *With.* 265. *Linn. Tranſ. vol.* 3. *p.* 240. *t.* 21.
Near Richmond. Mr. Robſon, in Tranſ. of the Linnean Society.

rubrum - - *Hudſ.* 99.
In the Northern parts of the county. Wenſleydale.

Glaux maritima - *Hudſ.* 101. *With.* 268.
Sea ſhores. Banks of the Humber.

Vinca minor - - *Hudſ.* 91. *With.* 268.
Near Kirkham Abbey, and Weſtow. Mr. Grimſton.

Campanula hederacea *Hudſ.* 97. *With.* 244.
Near Halifax. Mr. Bolton, in *Hudſ.*

Anagallis cœrulea - *Hoffm. Germ. Fl.* 70. *β.* arvenſis. *Hudſ.* 87.
Malton corn-fields.

Obſ. Mr. Knowlton informs me, that this plant has ſown itſelf many years in the garden at Londeſbrough, and that it never varies: I therefore preſume it may be a diſtinct ſpecies, though I do not perceive the difference in the calyx, mentioned by Hoffman.

Verbaſcum nigrum - *Hudſ.* 90. *With.* 250.
North, and Weſt-ridings, in many places.

Rhamnus Frangula - *Hudſ.* 98. *With.* 259.

Houghton-moor. This is rather a rare plant in the North of England, but is very common in all the hedges in ſome parts of Wiltſhire.

DIGYNIA.

Chenopodium maritimum *Hudſ.* 107. *With.* 273.
Flamborough Head. Col. Machell.

Beta maritima - - *Hudſ.* 108. *With.* 277.
Bridlington Quay.

Eryngium maritimum *Hudſ.* 109. *With.* 283.
Hornſea, ſparingly. Hollym in Holderneſs.

campeſtre - *Hudſ.* 110. *With.* 285.
Below Melling, plentifully. *Hudſ.*

Bupleurum tenuiſſimum *Hudſ.* 111. *With.* 285.
Near Stockton, Yorkſhire. Mr. Robſon.

Selinum paluſtre - - *Hudſ.* 115. *With.* 293.
Marſhes, near Beverley, abundantly.

Caucalis daucoides - *With.* 287.
Corn-fields near Malton. Thorp-arch. This is C. leptophylla in my former paper.

nodoſa - - *Hudſ.* 114. *With.* 289.
Tordylium nodoſum, in my former paper. Wall roots. Gravelly corn-fields.

ſcandicina - *With.* 289. Scandix Anthriſcus. *Hudſ.*
Garriſon walls at Hull.

Scandix odorata - - *Hudſ.* 124. *With.* 306.
In the wood at Knareſborough, where the

the dropping well is. Near Leeds. Mr. Wood, in *Withering.*

Smyrnium oluſatrum - *Hudſ.* 126. *With.* 310. *Eng. Bot.* 330.
Near Beverley, rare. About Scarborough Caſtle. *Hudſ.*

Athamanta Meum - *Hudſ.* 116. *Linn.* Æthuſa Meum. *With.* 305.
The mountainous parts of the Weſt-riding, ſparingly.

Carum Carvi - - *Hudſ.* 126. *With.* 311.
Meadows adjoining the river Humber near Hull, ſo plentifully that the poor people gather the ſeed to diſpoſe of to the druggiſts.
On the Wolds near Londeſbrough.

Pimpinella magna - *With.* 313. P. major. *Hudſ.* 127.
About Knareſborough. Helmſley. Caſtle Howard. Richmond.

diſſecta - *Retz. With.* 312.
On the Wolds—near Beverley.

Apium graveolens - *Hudſ.* 128. *With.* 314.
Marſhy ground near the ſea. Hull.

Sium repens - - *Sibth. Oxon.* 97. *With.* 300.
Ditches about Beverley.

Oenanthe crocata - *Hudſ.* 121. *With.* 302.
River-ſides, and ditches, in the North-riding.

TRIGYNIA.

Sambucus Ebulus - *Hudſ.* 130. *With.* 316.

Lund, in the Eaſt-riding. Many places in the North-riding.

Staphylea pinnata - *Hudſ.* 131. *With.* 317.
Hedges near Pontefract. *R. Syn.*

TETRAGYNIA.

Parnaſſia paluſtris - *Hudſ.* 131. *With.* 319.
Wet meadows. Paſtures, and heaths.

PENTAGYNIA.

Statice Armeria - - *Hudſ.* 132. *With.* 319.
Sea coaſt. Humber banks. Inglebc-rough Hill.

HEXANDRIA MONOGYNIA.

Galanthus nivalis - *With.* 331.
Hedges, and orchards: probably from gardens.

Convallaria majalis - *Hudſ.* 146. *With.* 341.
About Thorp-arch. Knareſborough. Woods in Craven. Mr. Caley in *With.*

multiflora *Hudſ.* 147. *With.* 342.
Woods, at Studley Park.

polygonatum Helks-wood, at Ingleton, and other rocky woods, near Settle. Sykes-wood. Curtis.

Narciſſus biflorus - *Linn. Eng. Bot.* 276. *With.* 332.
Banks of the river Wherf, at Thorp-arch, in plenty. Mr. Knowlton.

Pſeudo-

Pſeudo-Narciſſus - *Eng. Bot.* 17. *Hudſ.* 141. *With.* 332.
With the above, at Thorp-arch.

Juncus campeſtris - *β. Linn. Fl. Lapp. t.* 10. *f.* 2.
Marſhes, and bogs, near Beverley.
I have ſown the ſeeds, and it does not vary.
It is different (as the figure quoted above ſhews) from the Gramen hirſutum elatius, panicula juncea compacta. *R. Syn.* 416. which I believe will likewiſe be found to be a diſtinct ſpecies. I have not cultivated this, ſo as to be ſatisfied of it.
J. campeſtris, var. elatior. *Sibth.*

ſylvaticus - *Hudſ.* 151. J. maximus. *With.* 349.
Woods, common.

Acorus Calamus - - *Hudſ.* 147. *With.* 343.
Ponds, at Riſby—near Beverley.

Allium Schoenopraſum *With.* 335.
Meadows, near Kirby-moor-ſide.
Mr. Flintoff, in *With.*

carinatum - *Hudſ.* 139. *With.* 333.
Among rocks, at Conyſtone, and Kilnſay. Curtis.

Ornithogalum umbellatum *Hudſ.* 143. *With.* 337.
In a field, near Knareſborough. Mr. Robſon, in *With.*

luteum *Hudſ.* 143. *With.* 336.
Wellburn, near Kirby-moor-ſide. Mr. Grimſton. Near Greta-bridge, and Bignal.

Bignal. *R. Syn.* and Mr. Robſon. Near Doncaſter. Mr. Tofield. Under Malham Cove. Mr. Wood, in *With.*

TRIGYNIA.

Triglochin maritimum *Hudſ.* 152. *With.* 359.
Sea-ſide. Humber banks, at Hull.

Rumex digynus - - *Hudſ.* 156. *With.* 357.
Mountains, in the North and Weſt Ridings.

maritimus - *Hudſ.* 155. *With.* 356.
Woodmanſey, near Beverley.

aureus - - *With.* 356. β. maritimus. *Hudſ.*
With the above, at Woodmanſey.

Colchicum autumnale *Hudſ.* 157. *With.* 359.
Near Ferrybridge. Knareſborough. South Dalton.

POLYGYNIA.

Alisma natans - - *Hudſ.* 158. *With.* 362.
Lake at Hornſea. I have not ſeen it in flower.

ranunculoides *Hudſ.* 158. *With.* 362.
β. ranunculoides. *Hudſ.*
Ditches, near Beverley.

lanceolata - *With.* 362. β. A. plantago. *Hudſ.*
Marſhes, near Beverley.

OCTANDRIA MONOGYNIA.

Epilobium tetragonum *Hudſ.* 162. *With.* 368.
Woods, near Beverley; and in the North Riding.

alpinum - *Hudſ.* 163. *With.* 368.
Sides of rivulets in the mountainous parts of the Weſt Riding. Near Settle.

Chlora perfoliata - *With.* 369. *Hudſ.* 168.
Upon the Wolds, near Beverley. Between Doncaſter and Ferrybridge.

Vaccinium Vitis-idæa *Hudſ.* 164. *With.* 371.
Heaths, in the North and Weſt Ridings. Near Harrowgate.

Erica vulgaris - -
Tetralix - -
cinerea - - } Varieties with white flowers, on heaths near Harrowgate.

TRIGYNIA.

Polygonum minus - *Hudſ. Ed.* 1. 148. *With.* 380.
Woodmanſey, near Beverley, in a place where water ſtands in the Winter.

viviparum *Hudſ.* 169. *With.* 383.
Near Settle. Mr. Knowlton.
Wenſleydale. Curtis.

DECANDRIA MONOGYNIA.

Pyrola minor - - *Hudſ.* 176. *With.* 401.

Woods at Hackfall. Haſlewood. Near Clapham.

Pyrola ſecunda - - Haſlewood, near Sir Walter Vavaſor's Park. *R. Syn.*

Andromeda polifolia - *Hudſ.* 176. *With.* 398.
Upon the hills above Keighley, and abundantly on all that ridge of mountains which ſeparates Yorkſhire from Lancaſhire. Mr. Knowlton.
Bogs near Howden.

Arbutus uva urſi - *Hudſ.* 177. *With.* 399.
Specimens, from near Halifax.

DIGYNIA.

Saxifraga umbroſa - *With.* 403.
Reddins Gill, near Keighley. Mr. Knowlton.

ſtellaris - *Hudſ.* 179. *With.* 402.
oppoſitifolia - - - - -
autumnalis - *Hudſ.* aizoides. *With.*
hypnoides - - - - -
anguſtifolia *Curtis.* - - -
These are found on the rocky mountains in the Weſt Riding. On Ingleborough, Hinklehaugh, Malham Cove, and in various places, about Settle, and Ingleton.

Saponaria officinalis - *Hudſ.* 183. *With.* 408.
Near Shipton, a village between York and Market Weighton. Cottingham-moor.

Dianthus Caryophyllus *Hudſ.* 184. *With.* 410.
On the walls, at Fountains Abbey.

TRIGYNIA.

Silene nutans - - *Hudſ.* 188. *With.* 413.
On the rocks, about Knareſborough.

amoena - - *Hudſ.* 188. S. maritima. *With.* 414.
Sea-ſide, at Hornſea.

Stellaria media - - *Sibth. Fl. Oxon.* 141. S. glauca. *With.* 420.
Marſhes, near Beverley. Firſt pointed out to me by Col. Machell.

uliginoſa - *With.* 420. γ. S. graminea. *Hudſ.* 190.
Marſhes. Sides of ditches.

Arenaria peploides - *Hudſ.* 191. *With.* 421. *Eng. Bot.* 189.
At Hornſea. Bridlington Quay.

verna - - Mountains, about Settle.

laricifolia? - *Hudſ.* 192.
Upon Hinklehaugh.

PENTAGYNIA.

Cotyledon lutea - *Hudſ.* 194. *With.* 426.
Walls, and rocks, in the Weſt Riding. Mr. Toſield, in *Hudſon.*

Sedum Telephium - *Hudſ.* 195. *With.* 426.
Walls, and rocks, in the North and Weſt Ridings.

anglicum - - *Hudſ.* 196. *With.* 428. S. rubens. *Lightf.*
Rocks, in the Weſt Riding. Near Harrowgate.

villoſum - - *Hudſ.* 197. *With.* 426.
Ingleborough, Hinklehaugh, Hartſide Hills, in the Weſt Riding.

Ceraſtium

Ceraſtium ſemidecandrium *Hudſ.* 200. *With.* 435.
Barnby-moor, near Pocklington: this is not a common plant in Yorkſhire.

arvenſe - *Hudſ.* 201. Borders of corn-fields.

aquaticum *Hudſ.* 202. *With.* 436.
Sides of ditches, near Beverley.

Spergula laricina - *Hudſ.* 203. *Lightf.* S. ſaginoides. *Curtis.* S. ſubulata. *With.* 436.
Barnby-moor. Near Pocklington. Rare.

DODECANDRIA TRIGYNIA.

Euphorbia ſtricta - *Eng. Bot.* 333. E. verrucoſa. *Hudſ.* 209. *With.* 449.
Near York. *Ray's Syn.*

ICOSANDRIA MONOGYNIA.

Prunus Padus - - *Hudſ.* 213. *With.* 455.
Woods, and hedges, in the North and Weſt Ridings. About Ingleborough. *Curtis.*

DIGYNIA.

Cratægus Aria - - *Hudſ.* 214. *With.* 458.
Mountainous parts of the North and Weſt Ridings. Knareſborough.

PENTAGYNIA.

Spiræa ſalicifolia - *With.* 463.

In a hedge between Green Hammerton and Knareſborough, far from any houſe or garden; and as Dr. Withering informs us that it has been found in Weſtmoreland and Cumberland, I have now ventured to add it to our Yorkſhire catalogue.

POLYGYNIA.

Roſa villoſa - - *Hudſ.* 219. *With.* 466.
Woods, hedges, and ſhady ſituations—very common.

Rubus chamæmorus - *Hudſ.* 221. *With.* 471.
In peat earth, on the tops of the higheſt hills. Ingleborough. Kirby Fell. Fountains. Bulſworth. Hinklehaugh.

Geum intermedium - *Curtis.* G. rivale. var. 2. *With.* 478.
Woods in the North Riding. Walkington-wood, near Beverley; found there by the Rev. Mr. Rigby.

Potentilla fruticoſa - *Hudſ.* 222. *With.* 472.
On the South banks of the Tees, below Thorpe, and Eggleſton Abbey, and alſo near Greta Bridge, and Mickleforce Teeſdale. *R. Syn.* It ſtill grows abundantly in the above places. Mr. Robſon, in *With.*

Dryas octopetala - *Hudſ.* 226. *With.* 478.
On Arncliff Clowder, in Littendale, near Kilnſay. *Curtis.* Near Settle. Dr. Fell. In the Craven part of Yorkſhire. Mr. Wood. *Withering.*

POLY-

POLYANDRIA MONOGYNIA.

Chelidonium glaucium *Hudſ.* 229. *With.* 484.
Sea-ſide, in various places. Hornſea. Bridlington Quay.

PENTAGYNIA.

Aquilegia vulgaris - *Hudſ.* 235. *With.* 495.
Weſtwood, at Beverley. Upper part of Girling Trough, near Coniſtone, Kilnſay. *Curtis.*

POLYGYNIA.

Anemone Pulſatilla - *Hudſ.* 237. *With.* 498.
Dry paſtures, in the neighbourhood of Pontefract.

Thalictrum minus - *Hudſ.* 238. *With.* 501.
Thorpe-arch. About Settle, and Ingleton.

majus - *With.* 502. *Jacq. auſtr.* 420.
In Holderneſs, by Mr. Knowlton: he cannot recollect the exact ſpot.

Helleborus fœtidus - *Hudſ.* 245. *With.* 510.
In Lanes at Campſall, near Doncaſter.

DIDYNAMIA GYMNOSPERMIA.

Mentha ſylveſtris - *Hudſ.* 250. *With.* 521.
At Thorn. Mr. Robſon, in *Withering.*

rotundifolia - *Hudſ.* 251. *With.* 522.

Near

Near Saltburn, by the ſea, in a dry ſandy place. Mr. Robſon, in *Withering.*

Mentha pulegium - Wet commons. Near Terrington.

Galeopſis villoſa - *Hudſ.* 256. G. grandiflora. *With.* 528.
Sandy corn-fields. Not uncommon.

Tetrahit - *δ. Hudſ.* 257. G. cannabina. *With.* 529.
Corn-fields, between Beverley and Sancton. Near Green Hammerton.

Galeobdolon luteum - *Hudſ.* 257. *With.* 530.
Woods, at Bingley. Mr. Knowlton.

Stachys arvenſis - *Hudſ.* 260. *With.* 532.
Common, in light arable land. Near Malton. Walkington, near Beverley.

Leonurus Cardiaca - *Hudſ.* 261. *With.* 534.
Between Tickhill and Workſop. *Hudſ.*

Origanum Onites - *Hudſ.* 262. O. vulgare. var. 2. *With.* 535.
About Clapham. Mr. Caley, in *With.*

Meliſſa Calamintha - *Hudſ.* 263. *With.* 538.
Dry banks, near Biſhop Burton.

Nepeta - - Neighbourhood of Malton.

ANGIOSPERMIA.

Orobanche élatior - *Tranſ. Linn. Soc. vol.* 4. 178.
This is the O. major, in my former paper.

Melampyrum criſtatum *Hudſ.* 269. *With.* 544.
Among corn, at Waltonfield, near Wakefield. *With.*

pratenſe *Hudſ.* 270. *With.* 545.
Woods,

Woods at Beverley. At North Bierley. Dr. Richardſon.

Melampyrum ſylvaticum Woods at Caſtle Howard.

Antirrhinum Cymbalaria *Hudſ.* 271. *With.* 549.
On walls at Londeſbrough, where it was planted by the late Mr. Knowlton, and is naturalized, as on the walls London.

minus - Malton, and Walkington fields.

majus - Garden walls, and churches, in and near towns.

TETRADYNAMIA SILICULOSA.

Myagrum ſativum - *Hudſ.* 277. Moenchia ſativa. *With.* 562.
Among clover at Eſk, near Beverley: poſſibly the ſeed of the clover might have been foreign, and this plant introduced with it. I have frequently ſeen it mixed with foreign flax ſeed.

Bunias Cakile - - *Hudſ.* 298. *With.* 562.
Sea-ſhore, Hornſea.

Draba muralis - - *Hudſ.* 278. *With.* 566.
Fiſſures of the limeſtone rocks, about Settle, Ingleton, and Malham.

incana - - I found this in the ſame ſituations as the laſt, but ſparingly. On a rock near the ſummit of Ingleborough, on the weſt

ſide. Mr. Woodward. *With.* Roſeberry Coppin. Mr. Robſon.

Lepidium latifolium - *Hudſ.* 279. *With.* 567.
Amongſt the rocks at Plumpton. In the neighbourhood of Knareſborough.

Thlaſpi arvenſe - *Hudſ.* 281. *With.* 568.
Corn-fields, between Londeſbrough and Shipton. Mr. Knowlton.

campeſtre - Sandy fields. Not uncommon.

montanum - *Hudſ.* 282. *With.* 570.
Mountainous paſtures, about Settle, and Ingleton. Near the ebbing and flowing Well. *Hudſ.*

alpeſtre - *Eng. Bot.* 81. *With.* 570.
Moiſt limeſtone paſtures, about Settle.

Cochlearia officinalis - *Hudſ.* 283. *With.* 572.
Sea-ſhore. Ingleborough Hill.

groenlandica Ingleborough Hill. Flamborough Head.

Armoracia Banks of rivers. Beverley.

SILIQUOSÆ.

Cardamine bellidifolia *Hudſ.* 293. *With.* 577.
Said to grow in various places, about Ripon, in *R. Syn.* I could not meet with it.

impatiens Sides of rivulets in the North and Weſt Ridings. About Settle. Near Richmond.

flexuoſa - *With.* 578.

I have

I have ſpecimens gathered in the North Riding, but cannot recollect the place.

Siſymbrium ſylveſtre - *Hudſ.* 296. *With.* 581.
Marſhes, and ſides of ditches, at Beverley. Near Leeds. Mr. Wood, in *With.*

terreſtre - *With.* 582. *Curt.* 289.
At Cottingham.

Cheiranthus Cheiri - *Hudſ.* 287. *With.* 586.
Old walls, about towns.

Arabis thaliana - *Hudſ.* 292. *With.* 587.
Sandy dry banks. On walls.

Turritis hirſuta - - *Hudſ.* 291. *With.* 589.
On the Wolds, near Beverley, and many other places.

Braſſica oleracea - *Hudſ.* 289. *With.* 591.
Sea cliffs at Staiths. Mr. Robſon, in *With.*

muralis - - *Hudſ.* 290. *With.* 592. Siſymbrium murale. *Linn.*
Garriſon walls at Hull. Old walls at Malton.

MONADELPHIA DECANDRIA.

Geranium moſchatum *Hudſ.* 300. *With.* 609.
Craven. *R. Syn.* Hornſea. *With.*

phæum - In woods, about Settle, and Ingleton.

ſylvaticum Woods, and hedges, near the Wherf, at

Bolton. Mr. Knowlton. About Settle, and Ingleton.

Geranium pyrenaicum - Banks of the river, between Bingley and Keighley. *Hudſ.*

lucidum - Walls, and ſtony places, in the North and Weſt Ridings.

columbinum - I have ſpecimens which I collected in the Eaſt Riding, but cannot recollect the place.

puſillum - *Linn.*—parviflorum. *Sibth. Fl. Oxon. Ray's Syn. t.* 16. *f.* 2.
Sandy banks, at Bridlington Quay. Kexby Bridge, near York.

DIADELPHIA HEXANDRIA.

Fumaria capreolata - *With.* 621. F. officinalis. β. capreolata. *Hudſ.* 309.
Stony places, at Harrowgate, and Thorpe-arch.

claviculata - Among the rocks of Stonehall, ſeven miles from Leeds. Mr. Wood, in *With.*

DIADELPHIA DECANDRIA.

Ulex europæus - - β. *Hudſ.* Geniſta ſpinoſa minor. *Park.* 1003.
On heaths, in the ſouthern part of the county.

Obſ. This is certainly a ſpecies. See *R. Syn.* and *With.*

Ononis arvenſis - - *With.* 627. O. inermis. *Hudſ.* 312.
Paſtures, heaths, and meadows.
β. repens. *Hudſ.*
Sea-ſhore, at Hornſea.

Anthyllis vulneraria *Hudſ.* 313. *With.* 629.
Meadows, and paſtures, in gravelly and calcareous ſoils. Sea-ſhores.

Lathyrus Nifolia - *Hudſ.* 315. *With.* 632.
At Siggleſthorne, commonly called Silſton, in Holderneſs, found there by Mrs. Wharton.

paluſtris - In the marſhes, near Beverley, abundantly.

Vicia lathyroides - *Hudſ.* 318. *With.* 638. *Eng. Bot.* 30.
Under hedges, and buſhes, in dry paſtures. Near Beverley.

bithynica - - Gravelly corn-fields, and paſtures, and ditch banks, near Doncaſter. Mr. Tofield, in *Hudſ.*

Hippocrepis comoſa - *Hudſ.* 321. *With.* 641. *Eng. Bot.* 31.
Limeſtone rocks, at Malham, Settle, and Ingleton. Common in various parts of the North and Weſt Ridings, but never ſaw it in the Eaſt.

Aſtragalus glycyphyllos *Hudſ.* 322. *With.* 643.
Near Flaxby, a village near Knareſborough.

Trifolium

Trifolium ornithopodioides *Hudſ.* 324. T. melilotus ornithopodioides. *With.* 645. *R. Syn.* 331. *t.* 14. *f.* 1.
Half a mile from Tadcaſter, towards Sherborn. *R. Syn.*

ſtriatum - *Hudſ.* 327. *With.* 649.
Sandy fields, at Leven in Holderneſs. Near Caſtle Howard.

alpeſtre - *Hudſ.* 326. T. medium. *With.* 650.
Among buſhes. Edges of woods. Seaſhore, at Bridlington Quay.

SYNGENESIA POLYGAMIA ÆQUALIS.

Lactuca viroſa - - *Hudſ.* 337. *With.* 677.
On dry banks, and in hedges. Near Beverley.

Picris echioides - - *Hudſ.* 342. *With.* 673.
Sides of ditches, in lanes, near Beverley.

Hieracioides - *With.* Hedypnois Hieracioides. *Hudſ.* 342.
Borders of corn-fields, where the land is ſtony.

Leontodon palludoſum *Lightf. Fl. Scot.* 432. L. Taraxacon. *With.* 679. L. Taraxacum. β paluſtre. *Hudſ.* 339.
Sides of ditches, in the marſhes, Beverley.

hirtum - *With.* 682. Hedypnois hiſpidum β hirtum. *Hudſ.* 340.
Near Beverley.

Hieracium

Hieracium murorum - *Hudſ.* 344. *With.* 686.
Woods, and rocky places, in the North and Weſt Ridings. About Caſtle Howard. Bolton Abbey. *With.*

villoſum - *With.* 687. *Jacq. auſtr.* 87.
Clefts of rocks, near Mur Gill, at the foot of Ingleborough. Mr. Caley, in *With.*

Crepis biennis - - *With.* 690. Hedypnois biennis. *Hudſ.* 342.
On the Wolds, weſt of Biſhop Burton. Rare.

Hypochæris maculata *Hudſ.* 346. *With.* 691.
Near Ottermine cove, Settle. Mr. Caley, in *With.*

glabra - *Hudſ.* 347. *With.* 692.
On the common, cloſe to the inn, at Banktop, near Barnſley. Mr. Wood, in *With.*

Cichorium Intybus - *Hudſ.* 348. *With.* 693.
Borders of corn-fields, common in the North and Weſt Ridings, but I have not ſeen it in the Eaſt Riding.

Serratula tinctoria - *Hudſ.* 349. *With.* 695.
Near Londeſbrough. — This is one of the plants which are rare in the Eaſt Riding, but common in the other two.

Carduus eriophorus - *Hudſ.* 354. *With.* 700.
Road ſides, in various parts of the county.

county. Between Market Weighton and Londeſbrough.

Carduus pratenſis - *Engl. Bot.* 177. *Hudſ.* 353. *With.* 701.
Houghton moor.

helenioides - *Hudſ.* 352. *With.* 702.
In a wood near Londeſbrough; ſhewn me by Mr. Knowlton. Rocky paſtures, in the mountainous parts of the county.

Carlina vulgaris - - *Hudſ.* 355. *With.* 704.
Dry paſtures, and heaths. Near Beverley.

POLYGAMIA SUPERFLUA.

Artemiſia maritima - *Hudſ.* 358. *With.* 709.
Banks of the Humber, at Hull.

Conyza ſquarroſa - - *Hudſ.* 362. *With.* 717.
In the North and Weſt Ridings. Thorpe arch. Mr. Grimſton.

Erigeron acre - - *Hudſ.* 363. *With.* 718.
On the Wolds, frequent.

Tuſſilago hybrida - - *Hudſ.* 364. *With.* 721.
Near the river Wherf, between Ilkley and Skipton, in Craven.

Senecio ſaracenicus - *Hudſ.* 367. *With.* 726.
Near Halifax, in the fields, about Salkeld. *R. Syn.* About Clapham, and Ingleton. *Hudſ.*

Solidago cambrica - - *Hudſ.* 367. *With.* 728.

Mountains

Mountains in the Weſt Riding.
On the rocky precipice on the ſummit of Ingleborough, to the north-weſt. Mr. Woodward, in *With.*

Aſter Tripolium - *Hudſ.* 368.
β. Lightf. Var. 2. *With.*
Sea-ſhore at Hornſea.

Doronicum Pardalianches *With.* 732.
Near the World's end, at Harrowgate. Mr. Manby, in *With.*

Matricaria maritima - *With.* 736. M. inodora. *γ. Hudſ.* 373.
Flamborough Head. Rare.

POLYGAMIA FRUSTRANEA.

Centaurea Calcitrapa *Hudſ.* 376. *With.* 745.
Sands end, near Whitby. Mr. Robſon, in *With.*

MONOGAMIA.

Jaſione montana - - *Hudſ.* 377. *With.* 247.
Bulmer corn-fields. Sandy fields, between Weighton and Sancton.
Obſ. I have ſeen this plant upon heaths, with all the appearance of a perennial root; and Mr. Swainſton's gardener ſhewed it to me in his maſter's fine collection, where it is aſſuredly perennial.

Viola hirta - - *Hudſ.* 379. *With.* 260.
Woods at Caſtle Howard.
Londeſbrough, and Thorpe arch. Mr. Knowlton.

Viola arvenſis - - foliis ovato-oblongis dentatis, floribus calyci hirſuto æqualibus. *Hoffm. Germ. Fl.* 311.
Sandy ſoil, in arable land, very frequent.

Impatiens noli-me-tangere *Hudſ.* 380. *With.* 263.
Roots of the old walls in Fountains Abbey.

GYNANDRIA DIANDRIA.

Orchis latifolia - - *Hudſ.* 385. a variety with ſtraw-coloured flowers.
Bogs, and marſhes, near Beverley.

Ophrys aranifera - *Hudſ.* 392. *With.* 39.
Dry paſtures, about Branham (probably Bramham) near Tadcaſter. *With.*

Cypripedium Calceolus *Hudſ.* 392. *With.* 43.
About Arncliffe, Kilnſay, Litten, and Kettlewell. Mr. Knowlton.
I believe this plant is nearly eradicated in Helks-wood.

Serapias enſifolia - *With.* 42. S. longifolia. γ. *Hudſ.* 394.
Woods at Settle, and Ingleton. Helks-wood. In Cum Hag, a wood at Caſtle Howard. This is S. longifolia in my former paper.

rubra - - *With.* 42. *Engl. Bot.* S. longifolia. δ. *Hudſ.* 394.
About Clapham, and Ingleton, *Hudſ.*
I have a ſpecimen of this rare plant, but cannot recollect where it was found.

MONOECIA DIANDRIA.

Lemna gibba - - *With.* 44. L. minor. β. gibba, *Hudſ.* 399.
Ditches at Beverley.

TRIANDRIA.

Typha anguſtifolia - *Hudſ.* 400. *With.* 111.
Old marle-pits, between York and Market Weighton.

Sparganium natans - *With.* 112. *Engl. Bot.* 273. S. ſimplex, natans β. *Hudſ.* 401.
Ditches in Swinemoor, at Beverley.

Carex dioica - - *Goodenough. Tranſ. Linn. Soc. vol.* 2. 139. *Hudſ.* 401. *With.* 86.
In bogs, very frequent.

pulicaris - - *Leers, t.* 14. *f.* 1.
Bogs, wet meadows, and paſtures.

ſtellulata - C. muricata. *Hudſ.*
Bogs, marſhes, ſides of rivulets.

curta - - C. brizoides. *Hudſ.* C. caneſcens. *Lightf.*
I have only found this rare ſpecies in Terrington Car.

ovalis - - C. leporina. *Hudſ. Lightf.*
Woods, and moiſt clayey paſtures.

remota - - Woods, and ſides of ditches.

axillaris - - Sides of ditches, at Beverley, ſhewn me by Colonel Machell.

Carex arenaria - - *With. ed.* 3. *p.* 90. *t.* 20.
Low grounds, near Hull bridge, and Grove-hill at Beverley.

intermedia - C. diſticha. *Hudſ. Lightf.*
— arenaria. *Leers, t.* 14. *f.* 2.
Wet paſtures, and meadows, frequent. There ſeems to be more than one ſpecies included in this name.

diviſa - - *Tranſ. Linn. Soc. vol.* 2. *p.* 157. *t.* 19. *f.* 2.
In a meadow, called Derricots, near Hull. I never met with it in any other place.

muricata - C. ſpicata. *Hudſ. Lightf.*
Woods. Paſtures. Meadows.
I have ſeen this, or one in the ſame way, on the drieſt ſandy land, in which ſituation the capſules do not divaricate near ſo much as when growing in more moiſt places.

vulpina - - Sides of ditches, under hedges, in woods.

teretiuſcula - *Tranſ. Linn. Soc. vol.* 2. *p.* 163. *t.* 19. *f.* 3.
Arram Car, near Beverley, abundantly.

paniculata - Sides of ditches. Marſhes. Woods.
Obſ. We have in the marſhes a variety of this, with a ſmall compact panicle, which never forms itſelf into large tufts, as the C. paniculata does. It probably may be a diſtinct ſpecies.

præcox - - C. montana. *Hudſ. Lightf.*
Dry paſtures, and heaths. Common.

filiformis - *Tranſ. Linn. Soc. vol.* 2. *p.* 172. *t.* 20. *f.* 5.

C. tomentoſa. *Lightf.*
In all the watery marſhes about Beverley, very common.

Carex flava - - - Wet paſtures. Bogs. Sides of rivulets.

extenſa - - *Tranſ. Linn. Soc. v.* 2. *p* 175. *t.* 21. *f.* 7.
Wet paſtures, near Beverley.
I am not certain that this is the plant which Dr. Goodenough means.

fulva - - Wet paſtures, and meadows, in various places. Near Beverley.
I have ventured to continue this, as the figure quoted by Dr. Goodenough in *Fl. Dan.* 1049 is a good repreſentation of my plant, and it is certainly different from any of the varieties of the C. flava. It is alſo always a much weaker and ſmaller plant in all its parts than the C. diſtans.

diſtans - - Woods. Paſtures. Meadows.

panicea - - Wet paſtures. Meadows, and marſhes.

ſylvatica - - Woods, and hedges.

recurva - - *Leers, t.* 15. *f.* 3.
Heaths. Meadows, and paſtures.

palleſcens - *Leers, t.* 15. *f.* 4.
Woods. Paſtures, and meadows.

limoſa - - Bogs, near Terrington. Rare.

Pſeudo-cyperus *Hudſ. Lightf. Ger. em.* 29. *f.* 2.
In a place called Dumble pit, near Beverley; the only place I have ſeen it in, in the North.

Carex pilulifera - - *Hudſ. Lightf. Leers, t.* 16. *f.* 6.
Woods. Heaths, and paſtures.

cæſpitoſa - - *Tranſ. Linn. Soc. vol.* 2. *p.* 195. *t.* 21. *f.* 8.
In marſhes, and ſides of rivers, and ditches.

ſtricta - - *Tranſ. Linn. Soc. vol.* 2. *p.* 196. *t.* 21. *f.* 9.
C. cæſpitoſa. *Hudſ.*
Marſhes, and ſides of ditches.

riparia - - C. acuta. var. α. *Hudſ. Lightf.*
Banks of rivers. Wet meadows.

paludoſa - - C. acuta. *Fl. Lond.*
Sides of ditches, and rivers.

acuta - - - C. gracilis. *Fl. Lond.*
Banks of rivers. Beverley.

veſicaria - - C. inflata. *Hudſ. Lightf.*
Leers, t. 16. *f.* 2. III.
Ditches, at Beverley. Hull. Cottingham.

ampullacea - C. veſicaria. *Hudſ. Lightf.*
Sides of rivers. Wet meadows, and marſhes. Frequent.

hirta - - *Hudſ. Lightf. Leers, t.* 16. *f.* 3.
Woods. Wet meadows, and paſtures.

POLYANDRIA.

Ceratophyllum demerſum? *Hudſ.* 419. *With.* 440.
In a rivulet, near Harrowgate. I have not ſeen the fructification.

Myriophyllum ſpicatum *Hudſ.* 419. *With.* 389.
Ponds at Caſtle Howard, and Londeſbrough.

Myriophyllum verticillatum Ditches about Beverley.

DIOECIA DIANDRIA.

Salix triandra - - *Hudſ.* 425. *With.* 45.
Hedges. Oſieries. Banks of rivers.

pentandra - Sides of rivers. Rivulets. Ditches.
Near Beverley, and in moſt parts of the county.

vitellina - - In oſieries.

amygdalina - Hedges. Sides of ditches.

fragilis - - Sides of rivers, and ditches.

Helix - - River ſides.

purpurea - - *Linn. Hudſ.*
About Beverley.

This, and the S. Helix, are by ſome authors ſuppoſed to be one ſpecies, and they have named it S. monandra.

I have obſerved the following diſtinctions, in their native places of growth:

In the month of March, previous to their flowering, the bark of the young ſhoots of the S. purpurea is of a dark purple, and the ſcales of the buds are a fine red, (almoſt ſcarlet,) generally tipped with black, and before they drop off they turn wholly black; at the ſame time, the bark of the young ſhoots of the

S. Helix is of a yellowiſh brown, and the ſcales of the buds are always of a pale brown, or cheſnut colour.

I have ſeen but few female plants of the S. purpurea; they ſeem to be rare.

Salix myrſinitis - - On the ſlope of a high hill, between Kilnſay and Arncliffe. *Curtis.*

herbacea - - Ingleborough, and other high mountains, in the North and Weſt Ridings.

reticulata - - On the rocks on the uppermoſt part of Ingleborough, on the north ſide; and on a hill called Whern-ſide, over againſt Ingleborough, on the other ſide the ſubterraneous river. *R. Syn.*

repens - - Heath. Several varieties of it.

fuſca - - *Linn.* S. arenaria. *Lightf.*
Near Beverley.
I have one variety with ſtipulæ, and another without.

roſmarinifolia - On the edge of a rivulet which runs into Semer-water, Wenſleydale. *Curtis.*
Arram Car, near Beverley?

caprea - - Woods. Hedges.

acuminata - *Hoffm.* Sides of ditches. Hedges.

aurita - - S. caprea. *β. Hudſ.*
Woods, near Beverley.

cinerea - - *With.* Woods, and hedges.

viminalis - Oſieries. Sides of ditches.

alba - - By rivers and ditches.

TETRAN-

TETRANDRIA.

Hippophae Rhamnoides *Hudſ.* 431. *With.* 204.
On the ſea-bank, between Whitby and Lyth. *R. Syn.*

Myrica Gale - - *Hudſ.* 432. *With.* 208.
Houghton-moor.

OCTANDRIA.

Rhodiola roſea - - *Hudſ.* 434. *With.* 389.
Rocks on Ingleborough Hill.

POLYGAMIA MONOECIA.

Atriplex laciniata - *Eng. Bot.* 165. *With.* 274.
Sea-ſhore, at Hornſea.

ſerrata - - *Hudſ.* 444. A. littoralis. *With.* 275.
Humber banks, at Hull.

littoralis - *Hudſ.*
Sea-ſide, at Hornſea.

CRYPTOGAMIA FILICES.

Oſmunda regalis - *Hudſ.* 449. *With.* 763.
In a plantation, belonging to Lord Loughborough, at Harrowgate. Near Ripley.
About Keighley. Mr. Knowlton.

Oſmunda Lunaria - *β. Hudſ.* 449.
By the ſide of the Lake at Hornſea.

criſpa - - *Hudſ.* 450. Pteris criſpa. *With.* 764.
Ingleborough Hill. Haworth, near Halifax. Mr. Knowlton.

Blechnum Spicant - *With.* 765. Oſmunda Spicant *Hudſ.* 450.
Woods, and heaths.

Pteris aquilina - - Every-where.

Achroſtichum ſeptentrionale *Hudſ.* 450. *With.* 764.
Ingleborough Hill. Mr. Tofield, in *Hudſ.*

Aſplenium Ceterach - *Hudſ.* 452. *With.* 767.
Limeſtone-rocks, near Malham Tain, in Craven. *R. Syn.* And found lately in the ſame place by Mr. Knowlton.

Trichomanes β. ramoſum. *Hudſ.*
Ingleborough Hill. Hornby Hills. Rare.

viride - *Hudſ.* 453. *With.* 768.
On Ingleborough, and near Malham.
On walls, and rocks, above Settle. Mr. Knowlton.

viride - var. 3. *With.* A. ramoſum. *Linn.*
Ingleborough, and on limeſtone rocks, in the neighbourhood of Settle and Ingleton. Rare.

lanceolatum *Hudſ.* 454. *With.* 770. *Engl. Bot.* 240.
On a wall in the village of Wharf. Bolton.

Polypodium Lonchitis *Hudſ.* 455. *With.* 773.
Near Bingley. *Hudſ. ed.* 1.

Poly-

Polypodium fragile - Rocky parts of the North and Weſt Ridings. About Knareſborough and Harrowgate.

rhæticum *Hudſ.* 458. *With.* 780.
Near Fountain's Abbey. On rocks, about Knareſborough.

Trichomanes pyxidiferum *Hudſ.* 461. *R. Syn.* 127. *t.* 3. *f.* 3. 4.
In September 1782 I found this rare plant in Belbank wood, near Bingley, the place mentioned in *R. Syn.*; whether it be only a variety of the following, I leave to the deciſion of thoſe who may have frequent opportunities of examining it, in the places of its growth.

tunbridgenſe On the rock called Foal-foot, Ingleborough Hill. Bolton. This is the Hymenophyllum tunbridgenſe of Dr. Smith.

MUSCI.

Lycopodium alpinum *Hudſ.* 464. *With.* 759.
On the ſummit of Ingleborough, and other high hills in that part of the county.
About Keighley. Whitby. Mr. Knowlton.

Trentipohlia erecta - *Hoffm. Germ. Fl. v.* 2. *p.* 17. *t.* 14. *Fl. Dan.* 215.
I found this in a bog near Beverley, and could not gueſs what it was until I met with it figured in Hoffman.

Phaſcum cuſpidatum *Sibth. Oxon.* 273. *Schreb. t.* 1. *f.* 1. 2.
Woods, and dry banks. XII.—III.

curvicollum *Dickſ. f.* 2. *p.* 1. *With.* 786.
On the wolds, between Beverley and Market Weighton. III.

axillare - *Dickſ. f.* 1. *p.* 2. *t.* 1. *f.* 3. P. nitidum. *With. Hoffm.*
Sides of ditches, and in woods, at Beverley. X.—XII.

ſerratum - *Dickſ. f.* 1. *p.* 1. *t.* 1. *f.* 1. *With.* 785.—velutinum? *Hoffm. Schr. de Phaſ. t.* 2.?
In a wet paſture, called Swinemoor, at Beverley, and in arable lands among ſtubble. XII.—III.

muticum - *With.* 784. *Schreb. Phaſc. t.* 1. *f.* 11. 12. β. acaulon. *Hudſ.* 466. *Dill. t.* 32. *f.* 12.
Garden walks. Mud walls. Dry banks. XII.—III.

criſpum - cauleſcens, foliis lanceolatis longè acuminatis, revoluto-contortis. *Hedw.* 1. *t.* 9. *Hoffm. Germ. Fl.* 20.
Sides of ditches, in Figham, at Beverley. III.
Obſ. I ſent ſpecimens of this to my friend Mr. Dickſon, who named it, and added, that it had not been found in Britain before.

Splachnum anguſtatum *Dickſ. f.* 2. *p.* 3. *With.* 792.
In a bog, near Cottingham. Rare. IV. V.

vaſculoſum *Hudſ.* 469. *With.* 791.
Moiſt mountains, and heaths. *Hudſ.*

Fontinalis alpina - *Dickſ. f.* 2. *p.* 2. *t.* 4. *f.* 1., *With.* 789.
Mountain rivulets, in the North and Weſt Ridings. This is F. minor in my other paper.

minor - *Hudſ.* 468. *With.* 788.
In rivulets, above Helmſley. Hornby Hills.

ſquamoſa - *Hudſ.* 467. *With.* 788.
Rivulets, in the Weſt Riding.

Mnium arcuatum - *Dickſ. f.* 3. *p.* 2. *With.* 803.
In the boggy part of Houghton-moor.
In Greenfield, Saddleworth. *With.*

Polytrichum ſubrotundum
nanum -
aloides - -
commune -
piliferum - } On heaths. Earthen walls. Dry banks.

I found the laſt, with quinquefid capſules, at Harrowgate.

ſtrictum - } Upon heaths.
rubellum - }

urnigerum - Ingleborough Hill. Among the rocks on Hornby Hills.

alpinum - At Caſtle Howard. Ingleborough.

Orthotrichum criſpum *Hoffm. Germ. Fl.* 25. *Dill. t.* 55. *f.* 12.
anomalum — — — *f.* 9.
ſtriatum — — — *f.* 8.
affine *Hoffm. Germ. Fl. p.* 26.

Ortho-

Orthotrichum diaphanum *Schrad.*
On trunks of trees, and rocks.

Bryum apocarpum - var. 2. *With.* Hedwigia ciliata. *Hedw. Dill. t.* 32. *f.* 5.
On rocks, in the North and Weſt Ridings.

ſtrictum - - *Hoffm. Germ. Fl.* 36. β. purpureum. γ. *Hudſ. Dill. t.* 49. *f.* 52.
In bogs. III. IV.

aciculare - *Hudſ.* 479. Dicranium aciculare. *Swartz. Dill. t.* 46. *f.* 25.
On ſtones, in mountainous rivulets.
At Harrowgate. VIII.—IX.

bipartitum - *Dickſ. f.* 2. *p.* 7. *With.* 835. *Dill. t.* 49. *f.* 50.
Walls, and ditch banks. II. III.

calcareum - *Dickſ. f.* 2. *p.* 8. *t.* 4. *f.* 3. *Engl. Bot.* 191. *With.* 812.
On chalk-ſtones, near Biſhop-Burton. Rare.

caneſcens - *With.* 825. Trichoſtomum caneſcens. *Hedw. Dill. t.* 47. *f.* 27. D. E. F.
On heaths. Harrowgate. Houghton-moor.

lanuginoſum - *Swartz. Hoffm. Germ. Fl.* 41. *Dill. t.* 47. *f.* 32.
On heaths.

capillaceum - *Dickſ. f.* 1. *p.* 4. *t.* 1. *f.* 6. *With.* 831. β. æſtivum. *Hudſ.*
Ingleborough Hill. VIII.

cuneifolium - *Dickſ. f.* 3. *p.* 7. *Dill. t.* 45. *f.* 15.
Earthen walls, and dry banks. XI. XII.

Bryum

Bryum curviroſtrum - *Dickſ. f.* 2. *p.* 7. *Dill. t.* 48. *f.* 45.
Dry ſtony places, near Beverley. XII.—II.

barbatum - - *Curt. Dill. t.* 48. *f.* 48. *With.* 829.
Weſtwood, at Beverley. III.

flexuoſum - *Hudſ.* 484. *With.* 834. *Dill. t.* 47. *f.* 33.
On heaths very common, but not in fructification.

rigidum - - *Hudſ.* 477. *With.* 813. *Dill. t.* 49. *f.* 55.
Rocks, on Ingleborough. *Hudſ.*

fragile - - *Dickſ. f.* 3. *p.* 5. *Dill. t.* 47. *f.* 33. F. G.
Woods, and heaths. VII.

Heimii - - *Dickſ. f.* 2. *p.* 4. *With.* 815. *β.* truncatulum. *Linn.* et *Hudſ. Dill. t.* 45. *f.* 7. I. K.
Walls, and dry banks. XI.—III.

pellucidum - *Hudſ.* 481. Mnium pellucens. *With.* 802. *Dill. t.* 46. *f.* 23.
On large ſtones, by the ſide of a rivulet, north of Harrowgate. VIII.—X.

ovatum - - *Dickſ. f.* 2. *p.* 4.
Mud walls, and dry banks. XI. XII.

verticillatum - *Hudſ.* 485. *With.* 821. *Dill. t.* 47. *f.* 35.
On moiſt rocks, Yorkſhire. Dr. Richardſon.

polyphyllum - *Dickſ. f.* 3. *p.* 7. *Dill. t.* 48. *f.* 41.
Birmham rocks, near Ripley. VIII.

brevifolium - *Dickſ. f.* 2. *p.* 4. *Dill. t.* 47. *f.* 39.
Bogs, in Yorkſhire. *Dill.*

Bryum

Bryum virens - - *Dickſ. f.* 1. *p.* 4. *Dill. t.* 48. *f.* 43.
Dry banks. Sandy paſtures. XII.—III.
This is the B. viridulum in my former paper.

mucronulatum *Dickſ. f.* 3. *p.* 3. *With.* 817.
Sides of ditches, near Beverley. III. IV.
Obſ. The acuminated part of the Calyptra is frequently black.

lanceolatum - *Dickſ. f.* 3. *p.* 4. *With.* 824.
Mud-walls. Hedge-banks. I.—III.

fallax - - *Dickſ. f.* 3. *p.* 5. *With.* 833.
In Yorkſhire. *Dickſ.*

ventricoſum - *Dickſ. f.* 1. *p.* 4. B. triquetrum. *Hudſ.* 490. *Dill. t.* 51. *f.* 72.
Bogs on heaths. IV. V.

- γ. triquetrum. *Hudſ.* 491. Mnium nutans. *With.* 803. M. turbinatum. *Hoffm. Germ. Fl.* 49. *Dill. t.* 51. *f.* 74.
Bogs, and marſhy grounds.

bimum - - *Schreb.* M. bimum. *Hoffm. Germ. Fl.* 48. β. B. triquetrum. *Hudſ. Dill. t.* 51. *f.* 73.
In bogs. IV. V.

crudum - - *Hudſ.* 491. *Dill. t.* 50. *f.* 70.
Woods, in the Eaſt and North Ridings. V. VI.

Hypnum trichomanoides *With.* 484. H. complanatum. β. *Hudſ. Dill. t.* 34. *f.* 8.
Leſkia trichomanoides. *Sibth. Fl. Oxon.* 303.
Trunks of trees. Beverley.

Hypnum ruſcifolium - *Dickſ. f.* 3. *p.* 10. *With.* 848. *Dill. t.* 38. *f.* 31.
Banks of rivers. On ſtones in rivulets. IX. X.

luteſcens - *Hoffm. Germ. Fl.* 75. *Dill. t.* 42. *f.* 60. H. luteſcens. *Hudſ.* ?
Dry ſtony banks, between Beverley and Newbold. III. IV.

caſſubicum - *Dickſ. f.* 3. *p.* 10. *With.* 849.
In woods, and hedge-banks, near Beverley.

intricatum - *Eng. Bot.* 202. *With.* 849.
Roots of trees, near Beverley.

fluitans - - *With.* 851. *Dill. t.* 38. *f.* 33.
In the marſhes, near Beverley.
I have not ſeen it in fructification.

compreſſum - *Hudſ.* 498. *Dill. t.* 36. *f.* 22.
Trunks of trees. II. III.

murale - - *Dickſ. f.* 3. *p.* 10. H. myoſuroides. γ. *Hudſ. Dill. t.* 41. *f.* 52.
Upon the old walls, at Riſby, near Beverley.

molle - - *Dickſ. f.* 2. *p.* 11. *t.* 5. *f.* 8. *With.* 862.
Rocks, at Crambe Beck Bridge, between York and Malton.

filiforme - *Hudſ.* 497. *Dill. t.* 42. *f.* 62. H. filifolium. *With.*
Trunks of trees. XII.—III.

illecebrum? - *Hudſ.* 504. *With.* 862. *Dill. t.* 40. *f.* 46.
On the Wolds, in ſtony places. II. III.

Hypnum atro-virens - *Dickſ. f.* 2. *p.* 10. *Dill. t.* 43. *f.* 67.
Shady woods in the North Riding. IX.—XII.

myoſuron - *With.* 865. β. myoſuroides. *Hudſ. Dill. t.* 41. *f.* 50.
Roots of trees, in woods.

ſtriatum - *With.* 850. γ. rutabulum. *Hudſ. Dill. t.* 38. *f.* 30.
Roots of trees. Under hedges. XII.—II.

prolixum - *Dickſ. f.* 2. *p.* 13. *Dill. t.* 85. *f.* 20.
β. Hypnum riparium. *Weber.*
On ſtones, in mountainous rivulets, in the North Riding. Mill-dams.

paludoſum - ſurculis confertis decumbentibus, ramis ſimpliciuſculis erectis teretibus acutis; foliis ovato-acutis ſubſecundis; capſulis cylindraceis obliquis. *Swartz.*
Leſkia paludoſa. *Hedw. et Swartz.*
About the roots of willows, in the marſhes near Beverley. XI. XII.

muticum - - ſurculis plano-pinnatis, apice attenuatis, foliis ovato-lanceolatis appreſſis enerviis.
β. purum. *Hudſ. Dill. t.* 40. *f.* 47.
H. Schreberi. *Swartz. Act. Stockh.* 1795.
H. compreſſum. *Hoffm.* but not of *Linn.*
On heaths.

lacunoſum - caule et ſurculis incraſſatis, foliis ovato-acuminatis incurvatis ſecundis enerviis lacunoſis.

lacunoſis. *Hoffm. Germ. Fl.* 63. *Dill. t.* 37. *f.* 24. c.

Moleſcroft-car, near Beverley.

ALGÆ.

Jungermannia cochleariformis *With.* 876. J. purpurea. *Lightf.* Mnium Jungermannia. *Linn. Dill. t.* 69. *f.* 1.

Moiſt heaths——rarely found in fructification. I once found it in that ſtate near Harrowgate. VIII. IX.

ventricoſa - *Dickſ. f.* 2. *p.* 14. *Dill. t.* 70. *f.* 14.
Buſhy paſtures, near Beverley. IV.

ovata - - - *Dickſ. f.* 3. *p.* 11. *t.* 8. *f.* 6.
Houghton-moor. III. IV.

exciſa - - - *Dickſ. f.* 3. *p.* 11. *t.* 8. *f.* 7.
Woods at Beverley. IV.

pulcherrima - *Dickſ. f.* 1. *p.* 7. *Dill. t.* 69. *f.* 3. *Hoffm. Germ. Fl.* 83.

Heaths, at Harrowgate; and Houghton-moor, where I once found it in fructification. VIII.

Tomentella - *Hoffm. Germ. Fl.* 83.
This is the J. ciliaris. *Hudſ.* and in my former paper.

ſcalaris - - *With.* 870. J. trichomanes. *Dickſ. f.* 3. *p.* 10. *t.* 8. *f.* 5. *Dill. t.* 31. *f.* 5.

ſ. 5. Mnium trichomanes. *Linn. Hudſ.* and in my laſt paper.
Shady woods.

Jungermannia minuta - - - *Dickſ. f.* 2. *p.* 13. *Dill. t.* 69. *f.* 2.
Woods, near Richmond, creeping on ſome ſpecies of Hypnum.

viticuloſa - - *Hudſ.* 509. *With.* 873. *Dill. t.* 69. *f.* 7.
On ſtones, in rivulets, at Hornby-Hills and Malham Cove.

multiflora? - *Hudſ.* 510. *Dill. t.* 69. *f.* 4.
Houghton-moor.
I have not found it in fructification.

quinquedentata *Linn. Hudſ.* 509. *With.* 871. *Dill. t.* 71. *f.* 23.
In moiſt ſhady woods. Dr. Richardſon. *R. Syn.*

julacea - - - *Hudſ.* 516. *With.* 881. *Dill. t.* 73. *f.* 38.
Rocks in the Weſt Riding. Birmham Rocks.

rupeſtris - - *Hudſ.* 516. *With.* 882. *Dill. t.* 73. *f.* 40.
Birmham Rocks.

alpina - - - *Hudſ.* 517. *With.* 882. *Dill. t.* 73. *f.* 39. Andreæa petrophila. *Hoffm. Germ. Fl.* 80.
On Ingleborough and Birmham Rocks.

Junger-

Jungermannia curvifolia - - *Dickſ. f.* 2. *p.* 15. *t.* 5. *f.* 7.
Birmham Rocks.

concinnata - - *Lightf.* 786. *With.* 881.
Birmham Rocks.

trichophylla - *Hudſ.* 516. *With.* 882. *Dill. t.* 73. *f.* 37.
Heaths, near North Binley. Dr. Richardſon.

ſinuata - - *With.* 869. *Dill. t.* 74. *f.* 44.
Sides of ditches, near Beverley. Bell Bank, near Bingley. *Dill.* Middleton Wood, near Leeds. Mr. Wood, in *With.* III. IV.

tomentoſa - - acaulis, frondibus ramoſo-furcatis linearibus, obtuſis, tomentoſis. *Hoffm. Germ. Fl.* 91.
On rocks, in the North and Weſt Ridings.

bicornis - - fronde pinnata, foliolis alternis, bicuſpidatis; cuſpidibus polleniferis. *Fl. Dan. t.* 888.
On the Wolds, between Beverley and Market-Weighton.

Blaſia puſilla - - - - - - *Hudſ.* 518. *With.* 886. *Dill. t.* 31. *f.* 7.
Near Halifax. Mr. Bolton.

Targionia ſphærocarpos - - *Dickſ. f.* 1. *p.* 8. *Dill. t.* 78. *f.* 17.
In fallow fields, near Beverley. X. XI.

Targionia

Targionia hypophylla *Hudſ.* 519. *Dill. t.* 78. *f.* 9. *Eng. Bot. t.* 287.
Near Keighley. Mr. Knowlton. Moſſy places in Yorkſhire. Dr. Richardſon.

Riccia natans - - *Eng. Bot.* 252. *Hudſ.* 522. *With.* 887. *Dill. t.* 78. *f.* 18.
In ditches, and ponds, near Beverley.

fluitans - - *Eng. Bot.* 251. *Hudſ.* 522. *Dill. t.* 74. *f.* 47.
With the above ſpecies, about Beverley.

Lichen albus - - *With.* 2. Byſſus lactea. *Linn.*
Trunks of trees. Decayed moſſes.

incanus - - On the ground. Trunks of trees.

cinereus - - On rocks.

antiquitatis - On rocks, large ſtones, and walls.

flavus - - Trunks of trees, and walls.

botryoides - Bark of trees, and walls.

hebraicus - -
pulicaris - - } *Sibth. Fl. Oxon.* 317.
Bark of trees.

roſaceus - - *Fl. Dan.*
Bark of trees.

atro-albus - *With.* 5.
On rocks.

immerſus - - *Eng. Bot.* 193. *With.* 6. *Relh. Fl. Cant.* 1026.
On chalk-ſtones, upon the Wolds.

ſanguinarius - *Eng. Bot.* 155. *With.* 6.
Trunks of trees, and rocks.

Lichen

Lichen graniformis - *Dickſ. f.* 1. *p.* 10.
On old pales.

æruginoſus - *Sibth. Fl. Oxon.* n. 880.
Trunks of trees, near Beverley. Rare.

muſcorum - *Relh. Fl. Cant.* n. 848. *With.* 7.
Upon moſs, on heaths, in the North Riding.

confluens - - *Dickſ. f.* 1. *p.* 9. *With.* 8.
On rocks, and walls, in the Weſt Riding.

niger - - - *With.* 10.
Rocks and old pales.

fuſco-ater - - *With.* 11.
On walls, and ſtones, near Harrowgate.

corneus - - *With.* 20. *t.* 31. *f.* 3.
On the trunks of oaks, near Beverley.

querneus - - *Dickſ. f.* 1. *p.* 9. *t.* 2. *f.* 3.
Trunks of oaks, in the Eaſt Riding.

geographicus - *Eng. Bot.* 245. *With.* 12. *Dill. t.* 18. *f.* 5.
Rocks, in the North and Weſt Ridings.

ſulphureus - *Dickſ. f.* 2. *p.* 17. *With.* 12.
Rocks, and walls.

atro-virens - *With.* 13.
On rocks, near Harrowgate.

rupicola - - *With.* 13.
Limeſtone rocks, and ſtones, in the Weſt Riding.

vernalis - - *With.* 14. L. ferrugineus. *Hudſ. Dill. t.* 18. *f.* 4.
Bark of trees.

Lichen

Lichen Bæomyces - - *Eng. Bot.* 374. L. ericetorum, in my former paper.
On heaths.

ericetorum - *Eng. Bot.* 372. *β. Lightf.* L. icmadophila. *With.* 15. L. elveloides. *Weber.*
On heaths. Houghton-moor.

flavo-rubeſcens *With.* 15. L. aurantiacus. *Lightf. Fl. Scot.* 810.
Bark of trees. Pales. Walls.

pertuſus - - *With.* 15. *Hudſ.* 525. *Dill. t.* 18. *f.* 9.
Rocks, and trunks of trees.

ventoſus - - *With.* 16.
Rocks, in the Weſt Riding. Near Harrowgate.

ſphærocephalus *Eng. Bot.* 414. *Dill. t.* 14. *f.* 3.
Trunks of trees, at Londeſborough; ſhewn me by Mr. Knowlton.

corallinus - *With.* 16.
Rocks, in the North and Weſt Ridings.

crenulatus - *Dickſ. f.* 3. *p.* 15. *t.* 9. *f.* 1.
Rocks, in Yorkſhire. *Dickſon.*

candicans - *Dickſ. f.* 3. *p.* 15. *t.* 9. *f.* 5.
Rocks, in Yorkſhire. *Dickſon.*

ſcrupoſus - - *Eng. Bot.* 266. *With.* 19. *Dill. t.* 18. *f.* 15. B.
On walls, dry banks, and heaths.

pulverulentus *Sibth. Oxon.* n. 893. *Dill. t.* 24. *f.* 71.
Trunks of trees.

tiliaceus - - *Dickſ. f.* 3. *p.* 16. *Hoffm. Germ. Fl.* 149.
On trees, near Walkington.

Lichen

Lichen olivaceus - - var. nitidus. *Sibth. Oxon. Dill. t.* 24. *f.* 78.
Trunks of trees.

pulverulentus *β. Weber.*
Trunks of trees, near Beverley. Rare.

fruſtuloſus - *Dickſ. f.* 3. *p.* 13. *t.* 8. *f.* 10. *With.* 19.
Rocks, in Yorkſhire. *Dickſon.*

pallidus - - *With.* 21.
Trunks of trees. Old paling. Walls.

frigidus - - *With.* 22.
On moſs, and heath, upon Houghton-moor.

marmoreus - *With.* 22.
On the bark of trees, and on the bare ground, covered with decayed moſs, in Yorkſhire. *Withering.*

cæſius - - *Dickſ. f.* 3. *p.* 14. *With.* 24.
On old paling, and trunks of trees.

byſſinus - - *With.* 25.
Trunks of trees, and ſtones.

flaveſcens - - *Hudſ.* 528. L. flavicans. *With.* 25. *Dill. t.* 18. *f.* 18. A. C.
On walls.

rimoſus - - *Dickſ. f.* 1. *p.* 12. *With.* 25.
Rocks, and ſtones, in Yorkſhire. *Dickſ.*

cæſius - - *Dickſ. f.* 2. *p.* 19. *t.* 6. *f.* 6.
On ſtones, in the Weſt Riding.

prainatus - *Dickſ. f.* 3. *p.* 15. *t.* 9. *f.* 4. *With.* 20.
On ſtones, in the mountainous parts of the Weſt Riding. Near Harrowgate.

Lichen luridus - - *Dickſ. f.* 2. *p.* 20. *Dill. t.* 30. *f.* 134.
Rocks, in the North Riding. Rare.

multifidus - *Dickſ. f.* 3. *p.* 16. *t.* 9. *f.* 7.
On ſtones, in the Weſt Riding. Near Harrowgate.

cartilagineus - *With.* 29. L. craſſus. *Hudſ.* 530. *Dill. t.* 24. *f.* 74.
About Malham. *Hudſ.* On rocks, near Harrowgate.

muralis - - *Dickſ. f.* 1. *p.* 11. *With.* 29.
Rocks and walls. Not common in the North.

albeſcens - - *Hudſ.* 529.
Trunks of trees.

Pſora - - - *With.* 26.
On ſtones. Rocks at Harrowgate.

ſquamatus - *Dickſ. f.* 2. *p.* 20. *Dill. t.* 30. *f.* 135.
On a heath, at Harrowgate. Rare.

centrifugus - *Hudſ.* 530. *With.* 32. *Dill. t.* 24. *f.* 75.
Rocks, in the Weſt Riding.

marginalis - *Hudſ.* 534. *With.* 34. *Dill. t.* 19. *f.* 25.
On walls, near Settle. Dr. Smith, in *Withering.*

foliaceus - - *With.* 35. *Hudſ. edit.* 1. L. alcicornis. *Lightf.* 872. *Dill. t.* 14. *f.* 12.
Heaths. Houghton-moor.

filiformis - *Hudſ.* 552. *With.* 38. *Dill. t.* 14. *f.* 10.
Roots of trees, in woods. Heaths. On walls.

Lichen

Lichen exiguus - - - *Hudſ.* 552. *Dill. t.* 14. *f.* 11. C. exilis. *Hoffm. Germ. Fl.* 121.
On walls. Roots of trees. Heaths.

tuberculatus - *Relh. Fl. Cant.* 435. *Dill. t.* 14. *f.* 6. C. K. L.
Cladonia tuberculoſa. *Hoff. Germ. Fl.* 122.
Heaths.

Cladonia criſtata. *Hoffm. Germ. Fl.* 124. *Dill. t.* 14. *f.* 9.
Heaths.

Cladonia prolifera. *Hoffm. Germ. Fl.* 122.
Heaths. Roots of trees.

Cladonia marginalis. *Hoffm. Germ. Fl.* 123. *Dill. t.* 14. *f.* 6. I. M.
Heaths. Walls.

Cladonia irregularis. *Hoffm. Germ. Fl.* 125. *Dill. t.* 15. *f.* 20.
Roots of trees, and heaths.

Cladonia coronata. *Hoffm. Germ. Fl.* 25. *Dill. t.* 15. *f.* 19. C.
Woods, and heaths.

radiatus - - *With.* 38. L. gracilis. *Hudſ.* 555. *Dill. t.* 15. *f.* 16.

Cladonia radiata. *Hoffm. Germ. Fl.* 120.
Barren heaths.

Cladonia Fibula. *Hoffm. Germ. Fl.* 127. *Dill. t.* 15. *f.* 15.
Barren ſtony ground, and heaths.

Lichen paſchalis - - *Hudſ.* 558. *Eng. Bot.* 282. *With.* 44. *Dill. t.* 17. *f.* 33.
Rocks, in the Weſt Riding.

fragilis - - *Hudſ.* 558. *Eng. Bot.* 114. *With.* 41. *Dill. t.* 17. *f.* 34.
Rocks, in the North and Weſt Ridings. Near Harrowgate.

ſpinoſus - - *Hudſ.* 556. *With.* 45. *Dill. t.* 16. *f.* 25.
On heaths. Houghton-moor. Harrowgate.

furcatus - - *Hudſ.* 556. *With.* 45. *Dill. t.* 16. *f.* 27.
Heaths. Dry banks. Earthen walls.

uncialis - - β. *Hudſ.* 555. *Dill. t.* 16. *f.* 21. B.
Cladonia biuncialis. *Hoffm. Germ. Fl.* 116.
Heaths. Houghton-moor.

Cladonia uncinata. *Hoffm. Germ. Fl.* 116. *Dill. t.* 16. *f.* 21. A.
Heaths.

jubatus - - *Hudſ.* 561. *With.* 46. *Dill. t.* 12. *f.* 7.
Uſnea jubata. *Hoffm. Germ. Fl.* 134.
On rocks, and trunks of old oaks, in the North and Weſt Ridings.

chalybeiformis *Linn. With.* 47. β. jubatus. *Hudſ.* 561.
Uſnea chalybeiformis. *Hoffm. Germ. Fl.* 135. *Dill. t.* 13. *f.* 10.
Rocks. Old paling. Trunks of trees, with the laſt ſpecies.

Lichen lanatus - - *Hudſ.* 562. *With.* 47. *Dill. t.* 13. *f.* 8.
Rocks, in the Weſt Riding. At Harrowgate.

prunaſtri - - *Dill. t.* 21. *f.* 55. B. G. I. Lobaria populina. *Hoffm. Germ. Fl.* 140.
On rocks, trees, and old pales, every where.
Lichenoides lacunoſum lacerum, latius et congeſtius. *Dill. t.* 27. *f.* 57. A. B. C. D.
On black thorn. Rare.

tenellus - - *With.* 56. β. ciliaris. *Hudſ.* 538. *Dill. t.* 20. *f.* 46.
Branches of trees, particularly the black thorn.

læte-virens - *Lightf.* 852. *With.* 58. L. herbaceus. *Hudſ.* 544. *Dill. t.* 25. *f.* 98.
In Yorkſhire. *Hudſon.*

plumbeus - - *Lightf.* 826. *With.* 60. L. cæruleſcens. *Hudſ.* 531.
On rocks, in the North and Weſt Ridings. Near Bradford. *Hudſon.*

concolor - - *Dickſ. f.* 3. *p.* 18. *t.* 9. *f.* 8. *With.* 62.
Trunks of trees. Beverley. Londeſborough.

puſtulatus - *Hudſ.* 549. *With.* 64. *Dill. t.* 30. *f.* 131.
Near Halifax. Bolton, in *Hudſon.*

polyrhizos - *With.* 64. L. velleus. *Hudſ.* 550.
Ingleborough Hill. Rare.

polyphyllus - *Hudſ.* 551. *With.* 65. *Dill. t.* 30. *f.* 129.
Rocks, near Harrowgate.

Lichen

Lichen ſaccatus - - *Hudſ.* 548. *With.* 67. *Dill. t.* 30. *f.* 121.
On rocks, and dry banks, in many places, in the North and Weſt Ridings.
About the mouth of Yordas-cave, near Ingleborough Hill. Dr. Smith, in *Withering*. Near Beverley. Rare.

polydactylos - *With.* 69. γ. caninus. *Hudſ.* 547. *Dill. t.* 28. *f.* 107.
Heaths. Roots of trees.

var. 2. *With.* δ. caninus. *Hudſ. Dill. t.* 28. *f.* 108.
On Rumble's mear (moor) near Helwick. *Dill.* and *Hudſon.*

rufeſcens - - *With.* 70. β. caninus. *Hudſ. Dill. t.* 28. *f.* 109.
Peltigera rufeſcens. *Hoffm. Germ. Fl.* 107.
Woods. Heaths. Roots of trees.

venoſus - - *Hudſ.* 546. *With.* 69. *Dill. t.* 28. *f.* 109.
In rocky places, north of Helmſley. Rare.

aphtoſus - - *Hudſ.* 547. *With.* 70. *Dill. t.* 28. *f.* 106.
Ingleborough Hill, and other parts of the county. *Hudſon.*

tremelloides - γ. *Lightf.* 842. *Dill. t.* 19. *f.* 34. *With.* var. 3.
In moſſy and ſtony paſtures.
δ. *Lightf. Dill. t.* 19. *f.* 35. *With.* var. 4.
Among moſs, in paſtures, at Beverley.

cochleatus - - *Dickſ. f.* 1. *p.* 13. *t.* 2. *f.* 9. *With.* 74.
Collema auriculatum. *Hoffm. Germ. Fl.* 98.

On

On large ſtones among moſs, by the ſide of a rivulet, north of Harrowgate.

In Yorkſhire. Curtis, in *Withering.*

Lichen nigreſcens - *Hudſ.* 537. *With.* 74. L. veſpertilis. *Lightf.* 840. *Dill. t.* 19. *f.* 20.

Trunks of old trees, particularly the aſh.

In ſtony places among moſs. Rarely found with ſcutella.

criſtatus - - *Hudſ.* 535. *With.* 75. *Dill. t.* 19. *f.* 26.

In moiſt ſhady ſituations, among moſs.

palmatus - - *With.* 74. *Dill. t.* 29. *f.* 30.

Among moſs, in woods where there is but little graſs. Old gravel walks.

criſpus - - *Hudſ.* 535. *With.* 76. *Dill. t.* 19. *f.* 23.

Shady ſituations, where the earth is but thinly covered with graſs, and moſs.

fluviatilis - *Hudſ.* 536. *With.* 77. *Dill. t.* 19. *f.* 28.

On ſtones in the rivulet that iſſues from Malham Cove. I have not found it in fructification.

IX. *A Continuation of the Hiſtory of Tipula Tritici, in a Letter to Thomas Marſham, Eſq. Tr. L. S. by the Rev. William Kirby, F. L. S.*

Read February 5, 1799.

MY DEAR FRIEND, *Barham, December* 1798.

AFTER all the pains we took laſt year to inveſtigate the hiſtory of the Wheat Inſect, we were obliged to leave it in ſome meaſure incomplete. This aroſe from our beginning our obſervations too late in the ſeaſon, after the parent fly had diſappeared. Determined to watch its progreſs this year from the firſt appearance of the ear, my ſucceſs, in moſt reſpects, has been anſwerable to my expectations. I have not indeed yet been able to aſcertain the male of our *Tipula*; but to make ſome amends for this diſappointment, I have had an opportunity of obſerving all the motions of the female, and beſides have diſcovered two new ſpecies of *Ichneumon*, which, in conjunction with that known before, and deſcribed in the laſt volume of the Linnean Society's Tranſactions (*a*), under the name of *Ichneumon Tipulæ*, ſeem to be intruſted with the important office of reſtraining within due limits the numbers of that very deſtructive little animal.

Without further preface, I ſhall now proceed to connect and put into form the different memoranda which I have by me on this ſubject, having adhered faithfully to the Linnean maxim, *Nulla dies ſine*

(*a*) Vol. iv. p. 232.

linea,

linea, and always taking my pencil and memorandum-book with me when I went into the fields to make my obſervations.

Previous to the ſeaſon when the ear begins to emerge from the *folium vaginans* (*b*), I have, as opportunities of examining fir plantations occurred, been upon the watch for De Geer's *Tipula Pini* (*c*); but not being ſo ſucceſsful as to meet with that inſect, I cannot aſcertain how nearly it may be related to its *congener* of the wheat. I was careful alſo, at the ſame time, to inſpect the plants that were in bloſſom in the borders of the wheat fields, in hopes of finding (*copulâ connexos*) the two ſexes of *Tipula Tritici*, but with no better ſucceſs.

It is to be obſerved that I had uſually choſen the forenoon for making my inquiries. It chanced that on the third of June laſt I had occaſion to paſs through a field planted with wheat, in the evening, and, to my great ſurpriſe and ſatisfaction, my attention was immediately arreſted by an innumerable hoſt of our *Tipulæ* flying about in all directions; and from that day to the latter end of the ſame month theſe inſects were always to be met with in the wheat fields. They were ſeldom to be ſeen much before ſeven o'clock; at eight the field appeared to ſwarm with them, at which hour they were all buſily engaged in laying their eggs; and about nine they generally diſappeared: they were indeed ſo extremely numerous, that if each of them were to lay its eggs in a different floret, and thoſe eggs were permitted to produce larvæ, I think, upon a moderate calculation, more than half of the grain would be deſtroyed. I have no-

(*b*) I was ſtrongly tempted to introduce two or three new words into this Paper, viz. *evaginate* and *evagination*, to expreſs without a periphraſis the emerging of the ear from the *folium vaginans*, and *ovipoſition* for the laying of eggs, from the Latin phraſe *ova ponere*; but leſt this liberty ſhould wear the appearance of affectation, I refrained from it.

(*c*) *Linn. Tranſ.* vol. iv. p. 228.

ticed twelve at one time depoſiting their eggs in the ſame ear. It is remarkable that amongſt the myriads that I have ſeen of the female, I ſhould not have obſerved one which I could take for the male: indeed, towards the latter end of the month, (24th,) I took two or three ſpecimens, which, except that they had black bodies and were ſmaller, appeared exactly ſimilar to our *Tipula*; but as neither their antennæ are hairy, nor their wings ſpotted, as was the caſe with the ſpecimen you received from Mr. Markwick, they can ſcarcely be the male. Indeed the appearance of the male, inſtead of being later than that of the female, ought to be as early or earlier, in order that they may be in readineſs to perform the work of impregnation previous to the ſeaſon in which the females lay their eggs, which begins, at leaſt it did this year, with the month of June. Hence I ſuppoſe that each ſex is diſcloſed from the pupa in the genial month of May, when, to uſe the poetical language of Scopoli upon another occaſion, "*nuptias inſtituunt, de loco in locum continuò volitantes, zephyro plaudente choreis* (*d*)."

Although theſe inſects are ſo numerous in the evening, yet in the morning not a ſingle one is to be ſeen upon the wing: they do not however then quit the field which is the ſcene of their employment; for, upon ſhaking the ſtalks of the wheat, or otherwiſe diſturbing them, they will fly about near the ground in great numbers. I found their ſtation of repoſe to be upon the lower part of the culm, with their heads upwards.

It is very entertaining to obſerve the method to which theſe inſects have recourſe in order to depoſit their eggs in a ſituation where the larvæ may ſoon arrive at their food: when engaged in this employment they are not ſoon diſturbed; which circumſtance affords the obſerver an excellent opportunity of examination. As I hinted

(*d*) *Ent. Carniol.* n. 801, ubi de *Ape fabulosâ*.

before,

before, a number may be ſeen at the ſame time upon one ear: they place themſelves in ſuch a poſition that their *anus* ſtands nearly at right angles with the margin of the glume of that floret which they mean to pierce. But how are they to introduce their eggs within the floret, for they depoſit them between the exterior and interior valvules of the corolla? To look at them when they are not engaged in this employment, their *anus* appears to be furniſhed with no inſtrument adapted to ſo nice an operation; but upon preſſure it exerts (*e*) a long retractile tube or *vagina* (*f*), which unſheaths an *aculeus* (*g*) (if I may ſo term it) as fine as a hair and very long. This *aculeus* it introduces into the floret, and there depoſits its eggs, which it uſually places upon the interior valvule of the corolla, juſt above the ſtigmata. After ſhe has done laying her eggs, the inſect withdraws her *aculeus* with great caution and deliberation: yet it ſometimes happens that ſhe is unable to effect this; in which caſe ſhe is detained a priſoner until ſome enemy devour her. In this ſituation I have found them more than once in my morning walks. I was very deſirous of ſeeing the eggs paſs through the *vagina*, but my firſt attempts were unſucceſsful: at length I was gratified with this pleaſing ſpectacle. I gathered an ear upon which ſome of our *Tipulæ* were buſy, and held it ſo as to let a ſun beam fall upon one of them, examining its operations under the three glaſſes of a pocket microſcope: I could then very diſtinctly perceive the eggs (*b*) paſſing one after another, like minute air bubbles, through the *vagina*, the *aculeus* being wholly inſerted into the floret. I examined this proceſs for full ten minutes, before the patient little animal diſengaged itſelf; and at laſt it was through my violence that ſhe diſcontinued her employment and flew away.

(*e*) For this ſenſe of the word *exert*, ſee Johnſon's Dict. Nos. iv. v.

(*f*) Tab. iv. fig. 2. a. (*g*) Fig. 2. b. (*b*) Fig. 2. c.

On the ſeventh of June, upon opening a floret, I diſcovered a ſmall patch of eggs; they were oblong (*i*), tranſparent, and of a pale buff colour. I afterwards found ſeveral of theſe little patches, containing from a ſingle egg only, to more than twenty. On the ſeventeenth I found, for the firſt time, a larva newly hatched: it adhered to the lower end of one of the anthers (*k*), and was perfectly tranſparent and colourleſs; from which circumſtance I conjecture, that it had taken no food. I afterwards detected two more in a ſimilar ſituation, one of which had become ſtraw-coloured from the contrary cauſe. In another floret, upon the ſame day, I found many with their heads immerſed in the woolly ſummit of the germen: ſome were in the interior valvule of the corolla; others appeared to be buſy upon the plumoſe ſtigmata, upon which I did not obſerve that any pollen had been diſcharged from the anthers. Upon the twenty-ſecond I obſerved that the larvæ were uſually in the ſituation repreſented in the accurate drawing engraved in the third volume of the Linnean Society's Tranſactions (*l*). All circumſtances conſidered, it ſeems to me moſt probable, that theſe animals do not feed upon the pollen before it is diſcharged from the anthers (*m*); yet one would think that in this caſe ſufficient muſt eſcape them to fertilize the germen. How they prevent this I can but conjecture; as their heads are often immerſed in the ſtigmata, and in the down obſervable upon the top of the germen, it is poſſible they may occaſion an obſtruction in thoſe fine ducts through which the fertilizing principle paſſes down into the grain; or they may conſume that ſpermatic moiſture upon the ſtigma, without the aid of which the pollen cannot perform its office. On the twenty-ninth the parent *Tipulæ* had all diſappeared, and ſoon after this period my inveſtigations were ſtopped by illneſs;

(*i*) Tab. iv. fig. 2. d. (*k*) Fig. 2. e. (*l*) Tab. xxii. fig. 10.

(*m*) Except perhaps when they are newly hatched.

but

but as I had brought them down ſo far as to connect them with thoſe made laſt year (*n*), this interruption was of leſs conſequence.

Before I take leave of this part of my ſubject, and give ſome account of the *Ichneumons* mentioned above, I muſt obſerve that the female of *Tipula Tritici* approaches very near to the female of one deſcribed by Geoffroy (*o*), which Fourcroy and Villars after him have called *Tipula immaculata*. His definition of that inſect, "*atra alis niveis*," and his deſcription in French, anſwer exactly to a minute black *Tipula*, which I find common upon the wheat, remarkable for its beautiful plumoſe antennæ (*p*). The female, he obſerves, is very different from the male, and it is neceſſary to have ſeen them copulating, not to make of it another ſpecies. It is ſhort, thick, yellow, with black eyes (*q*). He ſpeaks of his inſect as common in gardens, a ſituation in which I have never found *Tipula Tritici*. This deſcription certainly approaches very near to our female, yet the colour of that is deep orange, and not yellow: beſides, he makes no mention of the beautiful priſmatic hues which adorn the wings. The black male, mentioned above, diſappears at the ſame time with our female of the wheat, but it agrees in no reſpect with the ſpecimen you received from Mr. Markwick: beſides, I found another black one, which appeared to me to be its female.

I ſhall now proceed to give you ſome further account of the inſects which prey upon *Tipula Tritici*. I have reaſon to believe, as I

(*n*) *Linn. Tranſ.* iv. p. 230. (*o*) *Hiſt. ab. des Inſ.* ii. p. 567. n. 26.

(*p*) Le mâle de cette petite eſpéce eſt allongé comme les précédens, avec le ventre mince et en filet. Sa couleur eſt partout d'un noir matte. Ses antennes forment de beaux plumets. Ses ailes ſont d'un blanc laiteux, qui ſe fait d'autant plus remarquer, que ſon corps eſt fort noir.

(*q*) La femelle eſt très différente, & il faut les avoir vû accouplés enſemble pour n'en pas faire une autre eſpéce. Elle eſt courte, groſſe, de couleur jaune, avec les yeux noirs. On trouve cette Tipule partout dans les boſquets des jardins.

hinted

hinted before, that there are not leſs than three *Ichneumons* attached to it. If Providence for wiſe ends has created ſo deſtructive an inſect, it has been no leſs attentive to prevent it from becoming too numerous, by making it the food of ſo many other inſects.

Upon the ſeventh of June I obſerved a very minute *Ichneumon* exceedingly buſy upon the ears of wheat, which at firſt I took for *Ichneumon Tipulæ* (*r*); but upon a cloſer examination I found it to be a ſpecies entirely diſtinct (*s*), as will appear when I come to deſcribe it. As ſoon as I was convinced of this, and obſerved that it pierced the florets at a time when no larvæ had made their appearance, I conjectured that it muſt lay its eggs in the eggs of the *Tipula*. How far this conjecture was well or ill founded muſt be determined by future obſervations, as I do not think I have collected facts ſufficient to decide the queſtion. This inſect is furniſhed with an *aculeus* three or four times its own length (*t*), which is finer than a hair and nearly as flexile: this is commonly concealed within the abdomen, but when the animal is engaged in laying its eggs it is exerted: one day it gave me a full opportunity of examining this proceſs. It inſerts its *aculeus* between the valvules of the corolla near the top of the floret; its antennæ are then nearly doubled and motionleſs, its thorax is elevated, and its head and abdomen depreſſed: the latter, when it withdraws the *aculeus*, is moved frequently from ſide to ſide before it can extricate it. This inſect has allowed me to examine its operations under a lens for ſix or ſeven minutes: upon opening the floret into which it had introduced its *aculeus*, I could find neither egg nor larva of the *Tipula*; but, upon examining it very cloſely under three glaſſes, I diſcovered, ſcattered over one of the valvules of the corolla, a number of globular eggs

(*r*) *Linn. Tranſ.* iv. p. 226. Tab. iv. fig. 8. (*s*) Fig. 4. (*t*) Fig. 5. a.

 extremely

extremely minute (*v*), evidently not those of that insect. It is possible that there were in this floret eggs of the latter, which might be destroyed upon opening it, or escape my observation. At other times I have found eggs of *Tipula Tritici*, and once some larvæ, in florets upon which I had observed this *Ichneumon* busy. If we reason from analogy, and the general habits of the genus *Ichneumon*, the eggs of this insect ought to be deposited in some other insect in one of its states; but, in the instance above mentioned, it seems only to have been attentive to scatter them in such a situation as might lead them when hatched to their proper food. From the time in which it first makes its appearance, ten days before the hatching of the first larvæ, I am inclined to adopt my original conjecture, that the eggs are its prey; and yet there seems not to be a sufficient disproportion between the size of the one and the other for this purpose; at least it must take more than one to nourish a larva of the *Ichneumon* to its proper size. Where we are not in possession of sufficient instances to establish any fact beyond doubt, it would be great presumption to be too positive; I shall not therefore pretend to decide in which of its states our fly furnishes food to the offspring of this *Ichneumon*. I think we may with more confidence affirm, that it is attached to *Tipula Tritici* in one of them. The circumstance of its depositing its eggs within the florets of the wheat, in the very situation chosen by that insect for the same purpose, and usually where either its eggs or larvæ were concealed, sufficiently establishes this point; unless we may suppose it to prey upon *Thrips Physapus*. This latter insect, however, to the best of my recollection, I did not find in any of those florets which I examined after seeing this *Ichneumon* insert its *aculeus* into them. It is probable that its appearance is later, as there is no mention of it in my memoranda of this year.

(*v*) Tab. iv. fig. 5. b.

On

On the twenty-ſecond of June I obſerved another *Ichneumon* (*w*), not uncommon, piercing the florets of the wheat. This ſpecies did not appear to inſert its *aculeus* between the valvules of the corolla, but to pierce the glumes of the calyx; to effect which purpoſe it is armed with a very ſhort one ſub-exerted: of this I found both the ſexes; the male was diſtinguiſhed from the female by its large eyes, placed very near each other, with reticulations unuſually viſible. I preſume this to lay its eggs in the larvæ, but have not been able poſitively to aſcertain the fact. Upon the ſame day that I firſt obſerved this ſpecies, our *Ichneumon Tipulæ* made its appearance in great numbers; a ſtrong proof that the larvæ were now generally hatched. Concerning this *Ichneumon* I have no new remarks to offer, except that it muſt introduce itſelf within the floret to come at the larvæ, as appears from its mode of laying its eggs (*x*): ſo that theſe three enemies of the *Tipula* have each a different method of attacking it. The firſt undermines its little fortreſs, the ſecond makes a breach in the walls, and the third carries it by ſtorm (*y*).

Amongſt the inſects of other genera that I particularly noticed upon the wheat this ſeaſon, the *Aphis granaria* (*z*) was common; as was likewiſe a ſpecies of *Cimex* in all its ſtates, but I could not perceive that it devoured our *Tipula*. It anſwers in ſome reſpects to *C. lateralis* of Fabricius (*a*), but in others it differs much from it: I ſhall add a deſcription of it to the others at the end of this letter.

(*w*) Tab. iv. fig. 10. (*x*) *Linn. Tranſ.* vol. iii. p. 243. and vol. iv. p. 236.

(*y*) On the fourth of July I ſaw another *Ichneumon* inſerting its aculeus into a floret of wheat, but it evaded my endeavours to take it. It ſeemed much too large to have any connection with our *Tipula*.

(*z*) *Linn. Tranſ.* vol. iv. p. 238, note *.

(*a*) *Fabr. Sp. Inſ.* 2. p. 372. n. 209. *Linn. Syſt. Nat.* ed. Gmel. p. 2190. n. 517.

Several

Several species of the genus *Empis* also frequented the wheat fields, often carrying off our *Tipula* in their diminutive beaks.

I have now given you as complete an account of these insects as the observations of the present year enable me. Something still remains to be done; for instance, to ascertain the male, the hybernacula of the pupa, to collect further facts relative to the two new *Ichneumons*, and, from observations taken in successive years, to determine how far our crops of this grain depend upon the increase or decrease of the *Tipula* and its *Ichneumons*.

Cui bono? is a query often put to naturalists; and the agriculturist perhaps will ask upon the present occasion, Can you inform us how we may prevent or diminish the ravages of these insects? In reply to this, I would observe, that the first step towards curing a disorder, is to find out its cause. In the present instance this is the business of the naturalist, and this *is* done. The intelligent farmer has no longer to ask what occasions the mischief; all he has now to do, is to aim at discovering a remedy. By a set of experiments first made upon a small scale, he may possibly find out some method that will prevent this insect from laying its eggs in his wheat: these should commence as soon as the ear begins to quit the *folium vaginans* or hose; and they ought to be continued till the germen is impregnated, or, to use the rural phrase, the wheat is off the blossom. Perhaps fumigations of tobacco or sulphur, if made when the wind was favourable, might render the ear disagreeable to this insect. Much of the injury which this fly does, in years peculiarly favourable to its increase, it is possible, by some such means might be prevented; yet it is not certain that the total annihilation of it would be ultimately beneficial (*b*). But be it granted that our labours lead the

(*b*) We are very apt to think, that if certain noxious species of animals could be annihilated, it would be a great benefit to the human race; an idea that arises only from our

the way to no diſcovery of this kind, may it be ſaid that we have been idly buſy and unprofitably laborious, when we have ſucceeded in developing ſome of the moſt curious myſteries of nature, and in laying open the hiſtory of ſome of thoſe ſecondary cauſes, which, guided by the hand of Providence, produce ſcarcity or plenty as the one or the other preponderate?

As I made my deſcription of *Tipula Tritici* laſt year from a ſingle ſpecimen, and that produced before its time, it will hardly be deemed tautology if I draw out a new one; more eſpecially as an error with reſpect to the colour of its wings, much calculated to miſlead an examiner, has crept into it. In my MS. I find it "*alis albidis*," but I ſee it is printed "*alis hyalinis*," an expreſſion which completely miſrepreſents their colour. As two new ſpecies of *Ichneumon* are to be deſcribed, it may alſo not be amiſs to work over again the deſcription of *Ichneumon Tipulæ* with a view to them.

TIPULA *Tritici*.

T. rufo-fulva; oculis nigris; alis lacteo-iricoloribus margine pilofis.

Fœmina (c).

Tota rufo-fulva; thorax intenſiùs, pedes autem dilutiùs. *Antennæ* corpore ſublongiores, duodecim-articulatæ articulis pedicellatis

ſhort-ſightedneſs, and our ignorance of the other parts of the great plan of Providence. We ſee and feel the miſchief occaſioned by ſuch creatures, but are not aware of the good ends anſwered by them, which probably very much exceed it. I have heard of farmers, who, after having taken great pains to deſtroy the rooks from their farms, upon being ſucceſsful, have ſuffered infinitely more in their crops, from the great increaſe of the larvæ of inſects, before kept under by theſe birds, than they ever did from the rooks themſelves. The ſame might be the caſe, could we annihilate the *Tipula* of the wheat; for every link of the great chain of creation is ſo cloſely connected on each ſide with others, and all parts ſo combine into one whole, that it ſeems not eaſy to calculate the conſequences that would ariſe from the entire removal of the moſt inſignificant, if any can be deemed ſuch, from the ſyſtem.

(*c*) Tab. iv. fig. 1.

oblongis

oblongis medio conſtrictis (*d*), piloſulæ, nigricantes. *Oculi* nigri ſuprà conniventes. *Alæ* corpore longiores, amplæ, apice rotundatæ; margine omni, ſed interiori præcipuè, piloſo; lacteæ coloribus priſmaticis pro ſitu variè micantes. *Abdomen* vaginâ inſtructum retractili aculeum longiſſimum filiformem exſerente.

Longitudo corporis (*vaginâ exclusâ*) lin. 1.

Tritici ſpicas primâ æſtate veſperi circumvolitat, intra floſculos aculeum ani inſerens, ova inibi poſitura poſt quatuordecim dies larvæ excluſæ polline antherarum vel nectare ſtigmatum veſcuntur granum exinanientes (*e*).

ICHNEUMON. *Minuti, abdomine ovato ſeſſili.*

1. *inſerens.* I. ater; antennis capitatis; abdomine lanceolato nitido (*f*).

Corpus atrum. *Antennæ* fractæ capitatæ. *Caput* et *thorax* ſubobſcuri. *Alæ* hyalinæ aveniæ corpore longiores; ſuperiores lineolâ nigrâ, a baſi verſus medium ductâ, puncto rotundo deſinenti, notatæ. *Abdomen* lanceolatum, aterrimum, nitidiſſimum, valdè acutum, aculeum longiſſimum flexilem exſerens. *Pedes* nigreſcentes femoribus atris ſubclavatis.

Longitudo corporis infra lineam.

Præcedenti æqualis et hoſtis; horis diurnis circa ſpicas triticeas volans. In cujus floſculis, aculeo inſerto, ovis *Tipulæ Tritici*, uti ſuſpicor, ovula ſua committit.

(*d*) Tab. iv. fig. 3. The ſingular form and mode of inſertion of the joints of the antennæ are not to be ſeen, but under a powerful magnifier.

(*e*) Qu. Does Linnæus's *Ichneumon fecalis* (Syſt. Nat. Gmel. p. 2714. n. 70) belong to the larva of a *Tipula?*

(*f*) Fig. 4.

The antennæ of this very minute inſect are exceedingly ſingular (*g*). The firſt joint is long, rigid, and clavate (*h*); examined in a certain direction obcordato-bifid at the apex; this diviſion ſerves as a ſocket for the next joint to act in (*i*), which is connected with it by means of a ſtrong membrane or muſcle (*k*), and performs the part of a ball or pivot: the four next joints are perfectly globular (*l*), and extremely minute: the clava, unleſs under a very powerful magnifier, appears ſolid; but, in that caſe, it is plainly diſcerned to conſiſt of four articulations very cloſely ſet together (*m*).

2. *Tipulæ.* I. niger; antennis baſi pedibuſque rufis; tibiis poſticis clavatis apice nigris; abdomine obovato (*n*).

Corpus nigrum. *Antennæ* fractæ vibratoriæ, thorace longiores, rufæ articulis quatuor ultimis majoribus nigris. *Caput* et *thorax* ſubobſcuri. *Alæ* aveniæ immaculatæ, corpore longiores. *Abdomen* obovatum, nitidiſſimum, ſubdepreſſum, ſubſeſſile. *Pedes* rufi ſ. rufo-teſtacei, tibiis clavatis, poſticis apice nigris.

Longitudo corporis infra lineam.

Tipulæ Tritici larvis contemporaneus, infeſtus, quibus concredit ovula ſua, ovum unicum deponens ſingulis.

The antennæ of this inſect, as well as every other part, are extremely different from thoſe of the laſt. They conſiſt firſt of a very long joint rather flexuous (*o*); from this to the four laſt joints, under a powerful magnifier, we could diſcover no articulations (*p*), and yet from the mode in which this part of the antennæ appears ſometimes to be bent, I cannot help ſuſpecting that there are ſome,

(*g*) Tab. iv. fig. 6, 7. (*h*) Fig. 7. a. (*i*) c. (*k*) b. (*l*) d.
(*m*) Fig. 7. e. (*n*) Fig. 8. (*o*) Fig. 9. a. (*p*) Fig. 9. b.

although

although extremely minute. The four laſt joints are black, very diſtinct, and much larger than the reſt (*q*).

3. *penetrans.* I. nigro-æneus; abdomine atro-cæruleſcente, compreſſo; ano truncato, aculeo ſub-exſerto (*r*).

Corpus nigro-æneum, nitidum. *Antennæ* nigræ, clavatæ, thorace breviores, acutæ. *Alæ* aveniæ, hyalinæ; ſuperiores lineolâ mediâ marginis craſſioris nigrâ demum in diſcum obliquè incurrente, et puncto rotundo deſinenti. *Abdomen* atro-cæruleſcens, ſub-compreſſum, ano truncato, aculeo ſub-exſerto.

Longitudo corporis infra lineam.

Triticum frequentat ſimul cum præcedenti, glumas aculeo brevi penetrans ovula poſiturus. Maris oculi majores, pallidiores, approximati.

The clava of the antennæ of this little inſect conſiſts of four joints ſet cloſe together (*s*); the laſt is the largeſt, and acute. We could not with certainty determine whether its footſtalk was jointed or not.

I owe the drawings of the antennæ of the three laſt inſects to the accurate eye and pencil of the Rev. Peter Lathbury, of Woodbridge, F. L. S. a moſt ingenious and intelligent naturaliſt. Theſe *Ichneumons* (*t*) may be placed after *Ichneumon ſecalis* of Linnæus, and *Tipula Tritici* after *Tipula Pini* of De Geer.

(*q*) Tab. iv. fig. 9. c. (*r*) Fig. 10. (*s*) Fig. 11. a.

(*t*) The remarkable variations in the form of the antennæ in theſe three ſpecies, undoubtedly of one genus, ſufficiently prove that Geoffroy was wrong in ſeparating his genus *Eulophus*, &c. from *Ichneumon* merely on account of that circumſtance. *Hiſt. ab. des Inſ.* ii. p. 312. pl. xv. fig. 3.

I ſhall

I ſhall now, as I promiſed above, proceed to deſcribe the *Cimex* which I found ſo common upon the wheat in all its ſtates.

CIMEX. *Oblongi, antennis ſetaceis longitudine corporis.*

Tritici. C. anguſtus, niger; thoracis lateribus, coleoptrorum limbo, femoribuſque pallidis.

Corpus valde anguſtum, nigrum. *Roſtrum* thoracis longitudine, pallidum. *Antennæ* obſcurè rufæ articulo primo majore pubeſcenti, nigro. *Caput*, fronte acuta, poſticè pallidum, lineâ intermediâ longitudinali exaratum. *Oculi* prominuli. *Thorax* anticè anguſtior, lateribus lineoliſque tribus intermediis poſticis, pallidis. *Scutellum* nigrum lineâ intermediâ elevatiuſculâ. *Elytra* nigricantia margine exteriori latè pallida, pallore paululùm virenti. *Alæ* hyalinæ iricolores. *Pedes* lividi, tibiis tarſiſque poſticis nigris.

Longitudo corporis lin. 4.

Habitant in *Tritici* culmis et ſpicis, *Larva, Pupa, Imago.*

So much for this year's obſervations upon *Tipula Tritici.*

Believe me, &c. &c.

EXPLA-

Linn. Trans. V. tab. 4. p. 111.

fig 1

fig 2

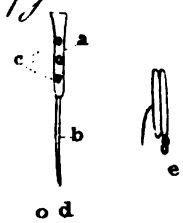


fig 3

fig 4

fig 5

fig 6

fig 7

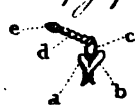


fig 8

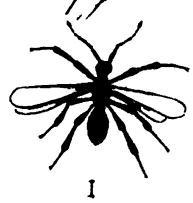
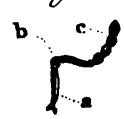


fig 9



EXPLANATION OF TAB. IV.

FIG. 1. *Tipula Tritici* magnified, with its *Vagina* and *Aculeus.*

2. (a) The *Vagina.* (b) The *Aculeus.* (c) The *Eggs* passing through the *Vagina.* (d) A patch of *Eggs.* (e) A *Larva* newly hatched, and adhering to the lower end of one of the Anthers.

3. A portion of one of the *Antennæ* greatly magnified to shew the form of its joints.

4. *Ichneumon inserens* magnified.

5. *Abdomen* of ditto. (a) *Aculeus* exerted, long and flexile.

6. The *Antenna* of ditto.

7. A different view of the *Antenna.*
   (a) The *first joint*, long, rigid and clavate, obcordato-bifid at the apex.
   (b) The *membrane* that connects the second joint with it.
   (c) The *second joint*, which acts the part of a ball or pivot.
   (d) The four following joints, globular and extremely minute.
   (e) The *Clava* of four joints set closely together.

8. *Ichneumon Tipulæ* magnified.

9. The *Antenna* of ditto.
   (a) The first joint, very long.
   (b) The space from the first to the four last joints, not visibly articulate, but I suspect it to be so.
   (c) The four last joints, black, and larger than the rest.

10. *Ichneumon penetrans* magnified.

11. The *Antenna* of ditto.
   (a) The *Clava* of four joints set close together, the last the largest and acute.

X. *Obſervations upon certain Fungi, which are Paraſitics of the Wheat. By the Rev. William Kirby, F. L. S.*

Read February 5, 1799.

DURING the time that my attention has been directed to thoſe inſects which frequent the wheat fields, I have often had occaſion to obſerve the appearances produced in that grain by ſeveral different ſpecies of *Fungi* (*a*), which derive their nouriſhment from it. I thought of conſidering this ſubject at large; but as my time is likely to be fully employed in other purſuits, I ſee no probability of doing this in the manner that I could wiſh; and therefore having made ſome obſervations, which, though by no means complete, may not be wholly unimportant, I now beg leave to lay them before the Linnean Society, truſting that they may ſerve as hints to others who may be inclined to enter more fully upon ſo intereſting a ſubject.

I have noticed five or ſix different ſpecies of theſe *Fungi*. The firſt I ſhall mention is named by Dr. Withering *Reticularia ſegetum* (*b*). In the Rev. Henry Bryant's pamphlet upon *Brand* (*c*), it is called

(*a*) That theſe appearances are produced by minute vegetables of the order of *Fungi*, ſeems now to be acknowledged by thoſe naturaliſts who are the moſt converſant with that order.

(*b*) Bot. Arr. vol. iv. p. 388.

(*c*) A particular Enquiry into the Cauſes of that Diſeaſe in the Wheat commonly called Brand, &c. Norwich 1783.

Duſt

Duſt Brand (*d*). Here its uſual name is *Smut* or *Burnt Corn.* This ſpecies is common to wheat, oats, barley, and rye. I have alſo ſeen *Feſtuca fluitans*, and ſome other graſſes, affected by it. It is ſcentleſs, and conſumes not only the farinaceous part of the grain, but even the arillus and chaff, diſperſing itſelf entirely before the corn is cut; ſo that the injury which it occaſions is confined to the quantity of grain deſtroyed by it, which is not very great in any ſeaſon. I have ſeen, more than once, half an ear of corn affected by this *Fungus*, when the other half was ſound and good. Sometimes it injures all the ſtems that ſpring from the ſame root; at other times part of them eſcape: I never could diſcover any diſeaſed appearance about the root. The ear is often affected by this *Reticularia* before it emerges from the *folium vaginans*, or *hoſe*.

Barley and oats are more frequently attacked by it than wheat; but this may be accounted for by the latter being uſually *dreſſed* for ſowing. Mr. Lathbury examined the duſt of this *Fungus* under a powerful magnifier, and found that it conſiſted of a number of minute particles, uniform in ſhape and ſize, much ſmaller and blacker than thoſe of the Pepper Brand, and leſs eaſily ſeparable: they ſeemed to be contained in little irregular cells. This duſt or ſeed is the food of a ſmall, ſhining, black *Dermeſtes* (*e*).

The next ſpecies that I ſhall mention is what Mr. Bryant diſtinguiſhes by the name of *Pepper Brand* (*f*); with our farmers it is ſimply called *Brand* or *Bladders*. This ſpecies does not eat through the arillus, conſuming only the farinaceous part of the grain. The ears affected by it are eaſily diſcovered by their external aſpect; for the chaff opens, as if unnaturally diſtended (*g*), the germen becomes ſhorter and rounder, and exhibits the appearance both of ſwelling

(*d*) Bryant, p. 31. 54—56. (*e*) *Dermeſtes ater.* Marſham. (*f*) Bryant, p. 32.

(*g*) Bryant, p. 43.

and (if it may be allowable to apply ſuch a term to it) inflammation; for, inſtead of the pale, pleaſant green which is the colour of this grain in a healthy ſtate, it aſſumes one of a deep and dingey hue: in this ſtate it eaſily breaks when rubbed; and the ſooty powder, that ſoils the fingers, emits a very fetid ſcent, extremely ſimilar to that of putrid fiſh or *Chenopodium Vulvaria*. Theſe circumſtances ſufficiently diſtinguiſh it from *Reticularia ſegetum*, and render it, when at all plentiful, exceedingly prejudicial to the farmer; for, as it does not eat its way through the arillus, and diſperſe itſelf before the corn is cut, it is carried with it into the barn, and, being broken under the flail, when the wheat is threſhed, diſcolours and otherwiſe injures the ſample, to ſuch a degree as to render it unſaleable, or at leaſt greatly to reduce its price. To prevent this evil, farmers generally dreſs their ſeed wheat with various preparations: ſome uſe a lixivium of wood aſhes and urine; others, ſalt and water only, or ſea water if at hand; others, the lie from the ſoap-boilers; others again, urine and cheeſe whey; and I have heard of ſome who have infuſed arſenic for this purpoſe. All, I believe, dry their ſeed with freſh ſlaked lime. This cuſtom, which is nearly univerſal, at leaſt in theſe eaſtern counties, proves the idea to be general, that the diſorder originates from the adheſion of the duſt or ſeed of the Brand to the ſeed of the wheat, and that by theſe methods it is either waſhed off or deſtroyed: but what kind of ſubſtance it is, whether animal, vegetable, or merely a diſtemper incident to this grain, agriculturiſts do not trouble themſelves much to inquire: this indeed is properly the buſineſs of the naturaliſt; and of theſe latter the opinions concerning it are various. Mr. Bryant, in the pamphlet referred to above, is ſtrenuous for its being occaſioned by an injury which he ſuppoſes the *antheræ* receive, by too great conſtriction, when the ear emerges from the *folium vaginans* (*b*); and therefore he ſcouts

(*b*) Bryant, p. 50—53.

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the common practice juſt mentioned of dreſſing the ſeed, as anſwering no good end, and deſtructive of the grain (*i*). Some take the duſt for the eggs of inſects, and others adopt, what to me appears the moſt probable opinion, that this evil is occaſioned by a minute vegetable of the order of *Fungi*.

Mr. Bryant founds his hypotheſis upon few experiments, and thoſe not very preciſely ſtated (*k*): the one was favourable rather than otherwiſe to the practice which he is endeavouring to ſet aſide (*l*). This was made upon a ſmall ſcale in his garden. From his larger experiment no fair conſequences in ſupport of either ſide of the queſtion can be drawn; for it was made in two ſeparate fields, the corn being ſown unprepared in one, and dreſſed as uſual in the other (*m*). Whether theſe fields were near to each other, or far aſunder, or of a ſimilar or different ſoil, he does not inform us. The reſult of this experiment was rather in favour (not much he confeſſes) (*n*) of the undreſſed ſeed. Now, as ſome years are much more favourable to the production of Brand, it is probable, than others (*o*), and it is not to be expected that any precaution ſhould ſo infallibly ſecure our crops as that they ſhall never be injured, no ſound reaſoner would venture to build a ſyſtem upon experiments, much more numerous and deciſive than thoſe related by Mr. Bryant, which were made in a ſingle year. Again, as ſome ſoils may be more given to the production of this diſeaſe, or whatever we are

(*i*) In juſtice to this gentleman, I muſt acknowledge, that, with reſpect to this circumſtance, his opinion ſeems founded upon fact; for I am informed by intelligent farmers, that much of the grain *does* periſh, as they ſuſpect, by the uſe of lime. But is the evil incurred, greater than the evil prevented?

(*k*) Bryant, p. 24, 25. (*l*) Id. p. 32, 33. (*m*) Id. p. 24, 25. (*n*) Id. p. 33.

(*o*) A tenant of mine, in the year 1797 I think, told me that his wheat that year was very much injured by the Brand, although he prepared it in the ſame manner as he had done for ten years before, and always till then with ſucceſs.

to call it, than others, nothing ſatisfactory can be deduced from ſuch experiments as are tried in different fields, where the ſoil, aſpect, or mode of cultivation and management, might be different. Mr. Bryant's method of accounting for this diſorder is certainly ingenious, but founded upon no arguments which can convince one who is in ſearch not of theories but of truth. That the practice of dreſſing the ſeed previous to ſowing, in the way above mentioned, is a very effectual preventive of the Brand, will appear ſufficiently evident, when I proceed to lay before the Linnean Society the reſult of ſome experiments made by my ingenious and accurate friend the Rev. Peter Lathbury, F. L. S. Upon my informing him that I was going to put together a few obſervations upon the ſubject, he very obligingly allowed me the uſe of his memorandum-book, which alſo related another very deciſive experiment, upon a large ſcale, made by a gentleman of his acquaintance. It was in conſequence of reading Mr. Bryant's treatiſe that Mr. Lathbury and this gentleman made their experiments. To theſe I ſhall add a few inſtances, out of many, that have fallen within my own knowledge.

Mr. Lathbury procured two ſmall parcels of wheat, one from a clean ſample not at all infected by the Brand, and the other from one which it had much injured. Each parcel he divided into four equal portions, and prepared for ſowing as follows, dreſſing one portion from each parcel in the ſame manner. The firſt he waſhed carefully with ſpring water, and wiped with a ſoft dry cloth. The next he dipped in ſtrong white wine vinegar, and allowed to dry upon a ſheet of writing paper. A third he covered with ſalt water taken from the river; and after letting it remain in it for twelve hours, he wiped it as the firſt. The fourth portions were not dreſſed at all. The wheat from the clean ſample was planted on one ſide of his garden, and that from the branded one on another. When he

ſowed

sowed the two undressed portions, before he covered the seed with earth he sprinkled upon it some Brand dust. The result of his experiment was, that the three first portions of both sorts which had been prepared for sowing were very little injured by the Brand. Those which were from seed of the clean sample had only one ear affected, and that partially. Those from the branded sample produced two ears that were partially branded, and three that were affected by the Smut or Dust Brand (*Reticularia segetum*). But the produce of those portions which had been sprinkled with the dust of the Pepper Brand was greatly injured by it, three-fourths of the grain being destroyed. There appeared no difference in the number of plants produced from each portion of the clean seed; every grain vegetated, except in one instance, where it was evident that those which perished were destroyed by an insect: but the number of plants produced from the injured seed was various; that which was washed with water produced the greatest number, and that wetted with vinegar the smallest. Mr. Lathbury, in the dressing of the seed for his experiment, does not appear to have used lime; which I should apprehend to be the most efficacious preventive of the evil, though at the same time it may probably be most destructive of the seed. These portions of wheat were sown at Orford on the 20th of September 1786.

The other experiment was made in the neighbourhood of Woodbridge in the following year. I shall give it in Mr. Lathbury's words: "Mr. John Woolnough of Boyton, a most intelligent and excellent farmer, read Mr. Bryant's pamphlet, and, in consequence of his arguments, the next year sowed a large field in alternate breadths with wheat taken from a good sample (*without dressing*) and wheat that had been dressed in the usual manner. Long before the corn was ripe, the difference was most distinguishable. Upon

those

thoſe *ſtretches* (*p*) ſown with dreſſed wheat it was difficult to find any branded ears, except upon the edges, where it is probable the undreſſed had been occaſionally thrown in ſowing it by hand. The other breadths were ſo branded as to make it neceſſary for him to determine to carry the corn at ſeparate times to different places. A wet ſeaſon ſetting in, the hurry of buſineſs made him neglect this precaution; and being all houſed together, the whole crop, when threſhed out, was ſpoiled ſo much by the Brand duſt as to render the ſample unſaleable. He computed his loſs at 50l." I ſhall now copy an inſtance from Mr. Lathbury's memorandum-book, of miſchief incurred by a defect in the quality of the lime uſed for drying the ſeed: "Mr. Howlett of Blighborough Lodge, always accuſtomed to dreſs his wheat with ſalt water and freſh ſlaked lime, was induced, from the magnitude of his concern, to purchaſe a quantity of lime which from ſome circumſtances was offered to him at a much leſs price than uſual. When he dreſſed his wheat with it, it was *air-ſlaked*, but did not appear otherwiſe altered by keeping; yet had it ſo far loſt its ſtrength, that his crop that year was injured by the Pepper Brand to the amount of upwards of 300l. in the opinion of good and able judges." Thus far Mr. Lathbury's communications.

I ſhall now proceed, as I propoſed, in the next place to mention ſome inſtances which fell within my own knowledge. Laſt year an intelligent farmer informed me, that through haſte he had neglected to dreſs part of his ſeed wheat, and that in conſequence of it the crop of the field where it was ſown was greatly injured by the Brand, while the reſt of his wheat was free from it. He alſo informed me, that if old wheat was uſed for ſeed, it was not ſubject to it. During

(*p*) I know not the orthography of this word. It is uſually pronounced *ſtetches*. It is the name given to thoſe breadths, narrower or wider according to the nature of the ſoil, into which a field is divided previous to ſowing.

the present year, a gentleman who occupies a considerable tract of land in the parish of Barham, and who is very attentive to farming, told me, that in a particular field, the dressed seed not holding out, they sowed the headland with what was undressed. The consequence was, that this part was very full of the Pepper Brand, while the rest of the field escaped. Another gentleman, who was brought up in the medical line, but has now taken to farming, assures me, that since he has dressed his wheat he has never suffered from this evil; and so convinced is he of the efficacy of the common method, that he is determined to prepare barley and oats in the same way, in order to prevent the *Dust* Brand. I could multiply more instances, if necessary, from information received from other quarters; but I think these are fully sufficient to prove that Mr. Bryant's hypothesis is not founded upon facts. It seems evident from them, that the mischief is carried with the seed into the field (*q*), and that the usual mode of dressing it acts as a sufficient preventive. From one of Mr. Lath-

(*q*) It may be objected here, that seed wheat is always taken from a clean sample, and that therefore it is most probable that it should meet with the seeds of the Brand in the soil; but in that case how could the previous dressing, especially a single washing, act as a preventive? Old seed, we see, is not subject to it; which must, I should think, arise either from the Brand Dust being rubbed off by the frequent friction of the grains one against another, when turned over, or from the latter losing its vegetative principle: but neither of these circumstances would hinder its attack, if the Brand Dust were already in the soil. Besides, its remaining within the grain, and not like the *Dust Brand* eating through the arillus, militates strongly against such a supposition. It is probable that in every wheat field a few scattered ears may be branded, and these would be sufficient to infect a large parcel of grain; for every diseased kernel contains millions of seeds of the Brand, and the frequent turning over and mixing of the corn would disseminate these through a considerable quantity. Still I would not be understood to assert, that Brand left in the soil never attacks the wheat: such a circumstance may account for its prevalence in some seasons, even where corn has been dressed: all I contend for is, that this is not usually the case.

bury's

bury's experiments it appears, that the ſimple waſhing of the ſeed with water, if it be carefully wiped, anſwers all the end of ſteeping in a more expenſive preparation. This perhaps could not be done with ſufficient care and accuracy upon a large ſcale, otherwiſe the moſt ſimple and leaſt expenſive method is certainly the beſt, and all that ſeems to be wanted previous to ſowing is thoroughly to cleanſe the ſeed from the Brand duſt that adheres to it. Probably wetting the ſeed with water, and afterwards drying it with freſh ſlaked lime, would anſwer every purpoſe.

The ſuppoſition that the Brand is produced by inſects is not ſupported by one fact or experiment that I have ever heard of: indeed, the ſingle circumſtance that the diſorder originates with the ſeed, and from thence paſſes by ſome unknown channel into the plant, entirely overturns it. I ſhall not therefore loſe time by dwelling upon it, but proceed further to eſtabliſh the third opinion, that the diſorder is occaſioned by a vegetable ſubſtance. The fact eſtabliſhed by the above experiments, that the duſt of Brand, carried into the field with the ſeed wheat, like other vegetables propagates itſelf, gives the higheſt degree of probability to this opinion; which is ſtill further confirmed by the reſult of Mr. Lathbury's experiment of ſowing it as it were upon its native ſoil (eſpecially in the caſe of wheat taken from a clean ſample), which ſeems to have occaſioned the deſtruction of three-fourths of its produce. This is as deciſive a proof as can be deſired of its being a vegetable. But what I think places the matter beyond all doubt, is that this duſt, when put under a powerful magnifier, exhibits every appearance of minute ſeed. I happened to take ſome duſt from branded grains, I think laſt year, which I laid by for future inſpection. After I had begun this Paper, I ſtrewed ſome of that duſt upon a piece of glaſs; and putting it under a very ſtrong magnifier over a reflector, I was highly gratified

fied with obſerving that every particle of Brand was a globular ſeed; not the leaſt variation in ſhape or magnitude was viſible amongſt them. I afterwards put a drop of water upon them, and let them remain in this ſituation for ſome time; but it produced no alteration whatſoever in their appearance. I afterwards examined in the ſame way the duſt of one of the ſtellated *Lycoperdons* which I happened to have by me; but the particles of this were much ſmaller than thoſe of the Brand, and not of a form ſo viſibly determinate. Mr. Lathbury alſo tried a variety of experiments with the ſame view; and in every one "the dùſt when diluted with water inſtantly ſeparated, and preſented to the eye invariably a number of globules, touching each other, alike in form and ſize."

It now remains for conſideration, how theſe ſeeds vegetate and aſcend from the ſeed with the growing plant till they reach the heart of the grain. This is an inquiry that may be extended to a great number of the *Fungi*, which without impropriety may be denominated *ſubcutaneous* vegetables; for inſtance, the ſeveral ſpecies of *Æcidium* (for they are numerous), *Uredo* (*r*), and not a few *Sphæriæ*, except that theſe latter grow upon decaying ſubſtances: but theſe I ſhall let alone, and only offer a conjecture, for it is merely ſuch, with reſpect to the Brand. Perhaps then the uncommonly minute ſeeds of this *Fungus* may attach themſelves either to the *plumula*, and ſo paſs through the air veſſels into the plant; or elſe to the *roſtellum*, which to me ſeems moſt probable; and in that caſe they may be propelled through the ſap veſſels with the ſap, till at length they arrive at their final ſeat, the heart of the germen. Whether this ſpecies belong to the genus *Reticularia* or not, I muſt leave to be determined by thoſe gentlemen who are more deeply ſkilled in "*cryptogamic lore*" than I am.

(*r*) Are *Æcidium* and *Uredo* ſufficiently diſtinct?

The next *Fungus* of the wheat that I ſhall notice, is that *Æcidium* known to agriculturiſts by the name of the *Red Gum*. This ſpecies grows uſually upon the inſide of the glumes of the calyx and of the exterior valvule of the corolla, under their *epidermis*; which, when the plant is ripe, burſts, and emits a powder of a bright orange colour. This little plant, which is now well known (*s*), does not appear to be materially injurious to the grain, if at all. I have ſeen ears full of it, with very plump kernels. I have alſo found it upon branded ears. Before the cuticle which covers the ſeed of this *Fungus* burſts, it has very much the appearance of a ſmall puſtule upon the human body.

Another plant of this order, which is very common upon wheat, is that named by Mr. Lambert in the Linnean Tranſactions (*t*), and by Mr. Sowerby in his elegant work upon Engliſh Fungi (*v*), *Uredo Frumenti*. It grows upon the foliage, culm, and glumes, burſting in longitudinal ſtreaks from under the *epidermis*. Theſe gentlemen repreſent this plant as the *blight* of the wheat, which in certain ſeaſons and ſoils is ſo injurious to that grain. I had myſelf for ſome time ſuſpected that it was the cauſe of that diſeaſe; but, after repeated examination of ears the ſtraw of which was quite black with it, I had given up that opinion, for in no one inſtance was the grain injured by it. Yet I would by no means be underſtood to contradict the aſſertion of theſe gentlemen *in totum*. This plant, when it makes its attack before the wheat begins to harden, by depriving it of part of its nutriment may occaſion it to ſhrink; and Mr. Lambert's own experience ſeems to confirm this obſervation: unleſs the miſchievous plant which I ſhall next mention had taken poſſeſſion of the ear, at the ſame time that the *Uredo Frumenti* had diſcoloured the ſtalk;

(*s*) *Linn. Tranſ.* vol. iii. p. 249, 250.
(*t*) Id. vol. iv. p. 193, 194.
(*v*) *Engliſh Fungi*, vol. ii. tab. CXL.

for

for the ſame circumſtances would be favourable to the production of both, although we have reaſon to be thankful that the latter is much the moſt common of the two. I doubt not but theſe gentlemen will readily excuſe my diſſent from their ſentiments in this inſtance; and ſhould future examination prove me in the wrong, I ſhall with pleaſure retract. In ſubjects not thoroughly diſcuſſed and underſtood, the colliſion of opinions contributes very much to bring hidden truths to light.

In the year 1797 the wheat ſuffered much by the *blight*, or *mildew* as our farmers more commonly call it, by far the worſt enemy of that grain; and I had frequent opportunities of examining into the cauſe of it. The ears that were injured by it were to be diſtinguiſhed at a conſiderable diſtance by their blackneſs; and when brought cloſe to the eye, they appeared as if ſoot, or ſome other ſmutty powder, had been ſtrewed over them. Under a common lens (for at that time I had no other) the chaff appeared covered with ſmall black dots irregularly ſcattered over it, and widely different from the appearance of *Uredo Frumenti* upon the ſame part, which is very accurately repreſented in Mr. Sowerby's figure. Whenever this appearance ſeizes an ear, it invariably occaſions the grain to ſhrink ſo much as to be fit for nothing but to feed hogs or poultry. I do not recollect making any obſervations upon the ſtate of the ſtraw; but I have a memorandum, made in a field from which I took many ears, which ſays that the ſtraw of the mildewed wheat in that field was clean; and if my memory does not fail me, the mildew itſelf was always confined to the ear; though ſometimes the ſtraw might be affected, as I hinted above, by *Uredo Frumenti* at the ſame time. Some farmers, whom I have conſulted, have told me that the ſtraw is always injured; but others have confirmed my own obſervation in the field above mentioned, that it is not invariably ſo. I ſhould obſerve, that the foliage

of the mildewed wheat in this field was diſtinguiſhed by another ſpecies of *Uredo*; though perhaps this might be only another appearance of the mildew, which diſcharged its ſeed at regular intervals in dots. From the abſence of *Uredo Frumenti* in this inſtance, it is evident that the mildew is independent of that plant, and ſo *vice versâ*. A whole diſtrict in the neighbourhood of Barham is particularly given to this evil; but improved management of the ſoil, I am told, will ſerve as a remedy. The appearance occaſioned by the mildew, upon an ear examined under a lens, did not ſo fully convince me of its being a *Fungus*, as that of the four preceding ſpecies; the dots were too minute to determine with certainty without a more powerful magnifier: yet I am moſt inclined to that opinion; and it derives additional force from what was once related to me by a gentleman who had been abroad, that an Italian Abbate, I forget who, had written a memoir upon the ſubject, in which he had proved the mildew to be a very minute *Lycoperdon*. He promiſed to ſend me the pamphlet, but was not ſo good as his word. The preſent year produced no mildew, that I can learn; and I ſent my ſpecimens to Mr. Sowerby.

I have now brought to a concluſion what I had to ſay upon thoſe paraſitic *Fungi* which I have obſerved upon the wheat; and I hope that theſe hints, for ſuch only I deſire that they may be conſidered, may induce other gentlemen, more deeply ſkilled in this department of natural hiſtory than I am, to purſue them further. The ſubject, if viewed as cloſely connected with agriculture, is certainly important; and if the ſtudy of it ſhould lead to a diſcovery of a method of preventing the *Blight*, as effectual as that which has long been uſed by farmers to ſecure their crops from the *Brand*, the naturaliſt who led the way to it would have no reaſon to think that his labours were in vain.

Much has been done in this country towards inveſtigating the

Fungi

Fungi by Meſſ. Withering, Woodward, Dickſon, Bolton, Sowerby, &c. yet the knowledge of this claſs of vegetables is *adhuc in incunabulis*, and many years muſt elapſe before we may expect to ſee it upon the ſame firm footing with the other branches of botany. There is ſcarcely a leaf (at leaſt of trees and ſhrubs) falls to the ground, that has not its peculiar *Fungus*, which, aſſiſted by humidity, reduces it to its original earth. The ſame obſervation may be extended to ſticks (*w*) and ſtalks, and many other ſubſtances. The more we attend to theſe things, the further we ſhall ſee into the plan of Divine Providence, and, every ſtep we take, be more and more convinced that there is nothing either deficient or ſuperfluous; but that all things are created in weight and meaſure, and work together (whether their office be to preſerve or to deſtroy) to promote the beſt ends by the moſt efficacious means.

(*w*) Mr. Sowerby, in his *Engliſh Fungi* (vol. ii. tab. CXXXVII), has given the name of *decorticata* to a particular ſpecies of *Sphæria*, as ſuggeſted by me, probably owing to my bad writing. The name I intended was *decorticans*, from the circumſtance of its growing under the bark, and finally occaſioning it to peel off.

XI. *Calendarium Plantarum marinarum. By Dawſon Turner, Eſq. F.L.S.*

Read March 5, 1799.

IN ſubmitting to the Linnean Society a liſt of the periods at which ſome of the Britiſh marine *Algæ* produce their fructification, it may not perhaps be wholly unneceſſary to preface it by obſerving, that the habitation of many of theſe plants at the bottom of the ocean, remote from any ſhore, where we are of neceſſity precluded from all poſſibility of tracing them through their ſeveral ſtages of growth, is certainly one of the greateſt obſtacles to our procuring a clear and comprehenſive knowledge of them. How far the difficulties ariſing from this circumſtance can ever be entirely removed, time and experience muſt alone determine; but we have reaſon to entertain very ſanguine hopes, as the beauty of this tribe has of late years attracted many admirers, to whoſe zeal and abilities marine botany is much indebted; and this Society may boaſt of having given to the world by far the moſt valuable account ever written of theſe plants. But much ſtill remains to be done; and it can be done only by naturaliſts reſident upon the different parts of the coaſt accuſtoming themſelves to examine attentively the various ſpecies in their ſeveral gradations, and laying before the world the reſult of their inquiries. To ſtimulate them to this, was one of my principal objects in bringing forward the preſent remarks; for, as no Britiſh author has given us any thing like a complete liſt of the times of fructification of the ſubmerſed *Algæ*, thoſe naturaliſts who are in the

the habit of occaſionally viſiting the ſea, and collecting its productions, are led to expect that whatever they find they will find in perfection; which has not unfrequently been the cauſe of error as well to themſelves as to others. For, to mention one inſtance among many, the *Fucus ſubfuſcus*, which is one of the moſt common ſpecies upon the Norfolk ſhore, and fructifies only in the earlieſt months of ſpring, is generally gathered in September, and often throughout the whole winter, with its ſtem and branches ſwollen in various parts; which ſwellings many very learned botaniſts have miſtaken for fruit, and conceived themſelves diſcoverers of either, what they called, diamorphous fructification, or new ſpecies; although, from having again and again, in company with my worthy friend Mr. Wigg, A. L. S. examined theſe tumours, I can ſafely pronounce them nothing more than the ſubſtance of the frond ſwollen, and cauſed, as I imagine, by ſome marine inſect, the ſame being, though not ſo frequently, obſervable upon other *Fuci*. It were eaſy to enlarge upon this ſubject, and produce many ſimilar inſtances of error; but as this one is ſufficient to eſtabliſh my point, I ſhall refrain from ſaying more at preſent, as I may probably at ſome future time lay before this Society a few remarks more particularly relating to the mode of fructification that obtains in theſe vegetables.

Having, on the foregoing accounts, been long conſcious of the greater facility which would attend our inveſtigation of the marine *Algæ*, could we fix with tolerable preciſion the times when we might expect to gather them at maturity, I have conſtantly habituated myſelf to commit to writing at what months I have found the different ſpecies in fruit; and though my liſt muſt neceſſarily be imperfect, as well becauſe I am obliged to truſt to the winds and waves, the nature of our ſhore not allowing us to viſit them in their places of growth, as becauſe we find upon our coaſt only a limited num-

6 ber,

ber, I nevertheleſs flatter myſelf with the hope that it may have its uſe, by inducing the botaniſts of diſtant counties to beſtow ſome attention upon this neglected branch of a favourite ſubject. For its accuracy, as far as it extends, I can with ſafety vouch, as I have admitted nothing that has not been the reſult of my own actual obſervation, either upon *Fuci* found along the Norfolk ſhore, or upon a few which I have at various times received through the medium of ſailors from the ſouthern counties.

It now only remains for me to add, that a principal cauſe of the imperfection of the following Catalogue lies in our being wholly unacquainted with the fructification of many ſpecies, as *Fucus ſaccharinus*, *Filum**, *viridis*, &c. together with almoſt all the membranaceous *Ulvæ*, and a great proportion of the *Confervæ*; which genus I ſhall hardly mention, as our knowledge of the ſpecies is at preſent ſo imperfect, that it requires more than ordinary fortune to find two botaniſts who agree in aſſigning to the ſame plant the ſame name.

YARMOUTH,
February 10, 1799.

* This *Fucus*, figured in the *Flora Danica*, tab. 886, was, I believe, firſt diſcovered to be a native of Great Britain by Sir Thomas Frankland, Bart. F. L. S. and is occaſionally gathered upon the Yarmouth beach. It deſerves to be remarked, that when freſh it is of a beautiful orange colour, which it loſes after having been a ſhort time expoſed to the air, and becomes of a pale verdegris green; but if kept in freſh water it changes this alſo to a dark brown.

JANU-

JANUARY.

Fucus sanguineus.
sinuosus.
loreus.
ciliatus.
membranifolius.
radiatus.
lumbricalis.
plicatus.
siliquosus.
crispus.
bifidus.
nodosus.
serratus.
patens.

FEBRUARY.

Fucus nodosus.
siliquosus.
serratus.
subfuscus.
plicatus.
sinuosus.
crispus.
laciniatus.

MARCH.

Fucus nodosus.
serratus.
plicatus.
subfuscus.
siliquosus.
sinuosus.
crispus.
laciniatus.

APRIL.

Fucus nodosus.
serratus.
plicatus.
diffusus.
subfuscus.
sinuosus.
crispus.
laciniatus.
Conferva coccinea. *With.*
polymorpha.

MAY.

Fucus subfuscus.
sinuosus.
laciniatus.
crispus.
diffusus.
Conferva coccinea.
polymorpha.

JUNE.

Fucus coccineus.
hypoglossum.

Fucus kaliformis.
dasyphyllus.
asparagoides.
byssoides.
diffusus.
Conferva rubra.
diaphana.
Ulva atomaria.
purpurascens.
ligulata.

JULY.

Fucus kaliformis.
hypoglossum.
byssoides.
coccineus.
asparagoides.
pedunculatus.
dasyphyllus.
pinnatifidus.
Conferva rubra.
diaphana.
ciliata.
Ulva ligulata.
atomaria.
dichotoma.
rubens.
purpurascens.
fistulosa.

AUGUST.

Fucus kaliformis.
pedunculatus.
purpurascens.
byssoides.
asparagoides.
coccineus.
dasyphyllus.
bifidus.
hypoglossum.
Conferva rubra.
diaphana.
ciliata.
Ulva ligulata.
atomaria.
dichotoma.
fistulosa.
rubens.

SEPTEMBER.

Fucus crispus.
dasyphyllus.
asparagoides.
confervoides.
bifidus.
coccineus.
purpurascens.
laceratus.
Conferva rubra.

Ulva rubens.
dichotoma.
atomaria.
fiſtuloſa.

OCTOBER.

Fucus bifidus.
radiatus.
faſtigiatus.
coccineus.
purpuraſcens.
criſpus.
rubens.
laceratus.
membranifolius.
ſanguineus.
ciliatus.
plicatus.
nodoſus.
confervoides.
Conferva rubra.
Ulva dichotoma.
atomaria.

NOVEMBER.

Fucus ſiliquoſus.
criſpus.
bifidus.
purpuraſcens.
Fucus lumbricalis.
radiatus.
plicatus.
nodoſus.
ciliatus.
pinaſtroides.
confervoides.
membranifolius.
Ulva dichotoma.
atomaria.

DECEMBER.

Fucus loreus.
nodoſus.
lumbricalis.
criſpus.
ſiliquoſus.
fibroſus.
radiatus.
ſanguineus.
purpuraſcens.
membranifolius.
ſerratus.
ſinuoſus.
ciliatus.

Fucus veſiculoſus and Ulva diaphana are found in fruit during the whole year.

XII. *An Account of the Onchidium, a new Genus of the Claſs of Vermes, found in Bengal. By Francis Buchannan, M. D. A. L. S.*

Read June 5, 1798.

THIS animal, which I have always found on the leaves of the *Typha elephantina* of Dr. Roxburgh, is very nearly allied to the Slug or *Limax*; but differs in ſo many of the circumſtances conſidered by Linnæus as characteriſtic, that I imagine it will be found to conſtitute a new genus. To this I would give the name *Onchidium*, from the number of little tubercles with which the whole upper part of the animal is covered.

VERMES. Molluſca. *Ore antico, corpore brachiato.*

ONCHIDIUM.

CHAR. GEN. *Brachia* duo ad latera capitis. *Tentacula* duo. *Os* anticum. *Anus* poſticus, infra.

ONCHIDIUM *Typhæ.*

Habitat in foliis *Typhæ elephantinæ.*

The body in its ſtate of reſt is oblong, convex above, about an inch long and three quarters of an inch broad, covering all the organs. When the animal creeps it becomes linear, obtuſe at both ends, about an inch and a half or two inches long, and half or three quarters of an inch broad; and the arms and feelers of the animal then become viſible. It is flat, black, and ſmooth below; above convex,

convex, aſh-coloured, and covered with glandular tubercles irregular in ſize and poſition.

United lengthwiſe, on the under ſide, to the body is what Linnæus would call the foot of the animal, as being the organ of motion and ſtability. It is of a dirty yellow colour, linear, about a quarter of an inch ſhorter than the body at each end when in motion, and obtuſe at the ends: it is flat below, and perpendicular at the ſides. It conſiſts of many tranſverſe rings, like a *Lumbricus*, by means of which the animal can move with tolerable quickneſs, adheres firmly to the ſmootheſt ſurfaces in all directions, and turns itſelf ſlowly round.

The head is yellowiſh, ſmall, and placed under the fore part of the body, at the fore end of the foot, to which it is joined. During the various operations performed by the animal, its head is conſtantly changing its form and ſize; and, when entirely at reſt, it is drawn up ſo as to be hardly perceptible. When fully expanded, the head is flat and oval below; and there is a mouth placed lengthwiſe with reſpect to the animal. This mouth alſo is conſtantly varying its ſhape from circular to linear. From each ſide of the head comes what Linnæus calls an arm (*brachium*), like thoſe of the *Scyllæa*, conſtantly varying its form and ſize, and at times entirely drawn in. Theſe arms are ſolid, compreſſed, and, when fully expanded, ſomewhat palmated; at leaſt they are much broader and flatter towards the outer extremity. From the forehead ariſe two feelers, *tentacula* of Linnæus, exactly like the horns of a Slug, and having the appearance of eyes at their extremities.

This is not, like many others of the worm kind, an hermaphrodite animal, for the male and female organs of generation are in diſtinct individuals. I have not yet perceived any mark to diſtinguiſh the ſexes while they are not in copulation, as, in both, the anus

and

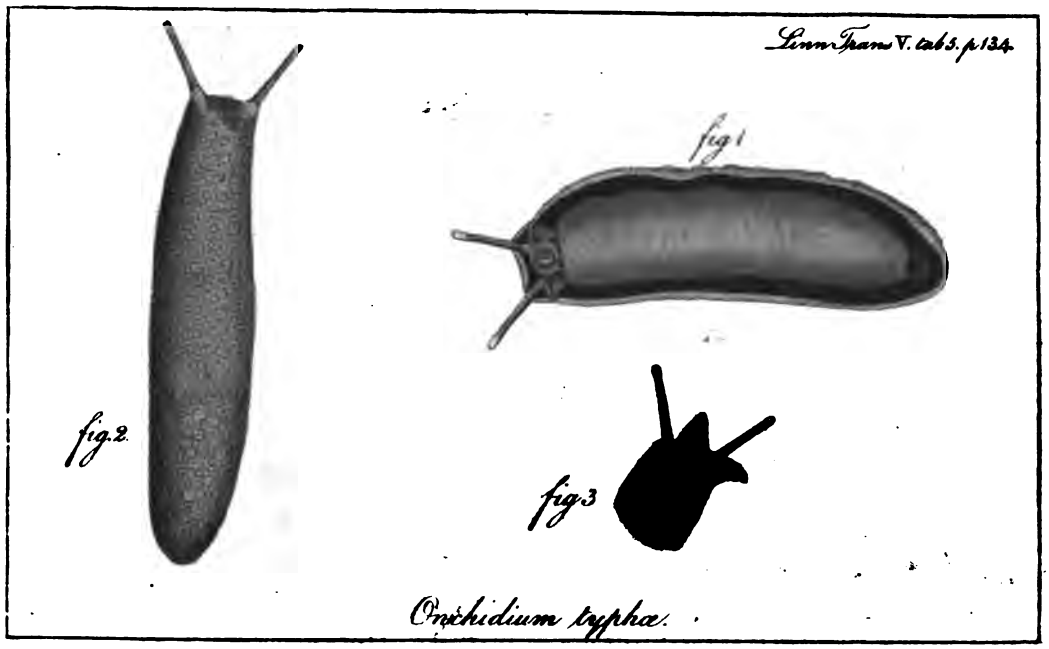
and ſexual organs are placed in a perforation (*cloaca communis*) in the under part of the tail, immediately behind the foot: but during coition the diſtinction of ſexes is very evident, the penis protruding to a great length, conſidering the ſize of the animal. I have as yet learned nothing with regard to the geſtation of the female, or how ſhe produces her young.

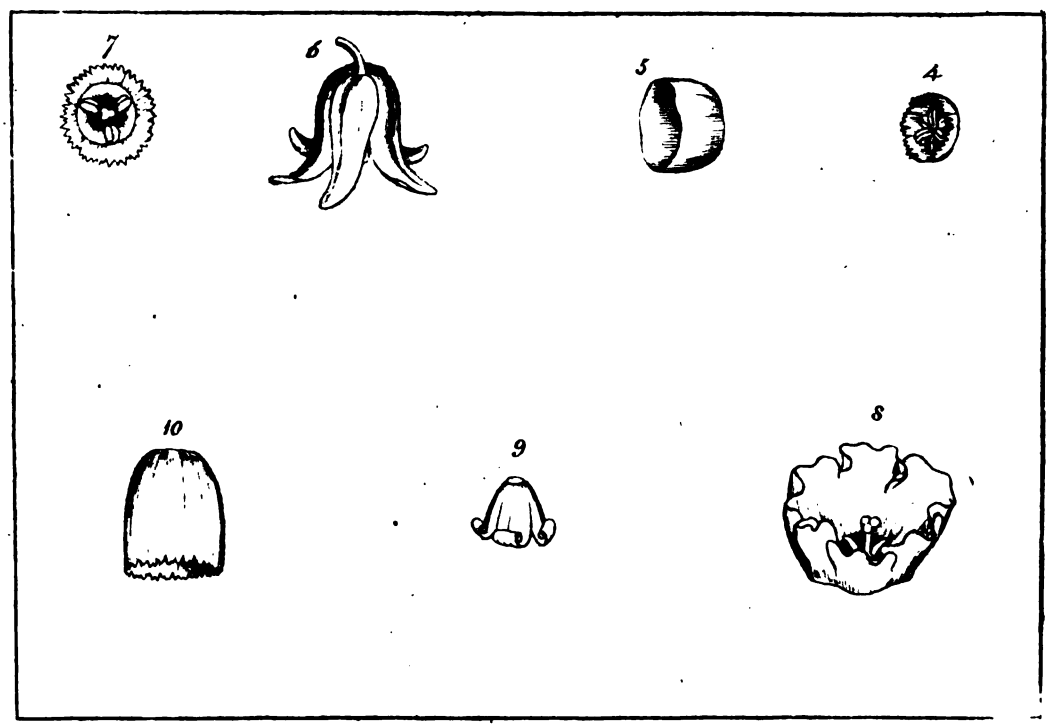
EXPLANATION OF THE FIGURES.

TAB. V. *fig.* 1. The under ſide of *Onchidium Typhæ.*

2. The upper part.

3. The ſide view of the head.


Linn Trans V. tab 5. p 134.
fig 1
fig. 2.
fig 3
Onchidium typhæ.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XIII. *Remarks on ſome technical Terms uſed in Botany.* By R. A. Saliſbury, Eſq. F. R. S. & L. S.

Read July 3, 1798.

AFTER the ſcientific Obſervations of Profeſſor Martyn on Botanic Language, publiſhed in the firſt volume of this Society's Tranſactions, and in an Engliſh tranſlation of the *Termini Botanici* of Linné, any thing further on the ſame ſubject may ſeem unneceſſary: but I am in the habit of uſing ſome terms in a ſenſe different from the Linnean definitions, and of excluding as well as introducing others, in my deſcriptions of plants; and I wiſh to learn how far the opinions of more experienced botaniſts agree with my own. Should I be encouraged, I may probably in future ſtudy this part of botany more particularly. What I have now to offer follows alphabetically.

Abbreviatus. This term in *Amæn. Acad.* is only mentioned under Perianthium, where an abbreviated perianthium is defined, not ſo long as the tube of the corolla. I recollect no inſtance of its being uſed in deſcriptions; ſo that it is ſcarcely worth retaining except for a ſpecific name. *Brevis* ſupplies its place, and admits of degrees of compariſon more readily.

Abruptè pinnatum folium. I conſider every leaf which terminates without an odd foliolum, as abruptly pinnated. Linné excludes *Cirrhus* alſo, or any other part: but, in that caſe, ſuch a leaf would

would rarely be met with; for I have yet ſeen no abruptly pinnated leaf, which had not ſome little proceſs or other beyond the laſt foliola. *Cirrhi* are inſerted very differently in different plants; and being particular organs deſtined to ſupport ſcandent ſtems, their inſertion ſhould always be ſeparately mentioned.

Acetabuliformis. Like a circular ſhallow ſaucer with the ſides more or leſs incurved. *Tab.* 5. *f.* 4.

Acicularis is nearly ſynonymous with *ſubulatus*, but I conſider it as indicating a more delicate and pungent point.

Acuminoſum folium. This I would define, apice in acumen planiuſculum attenuatum, to diſtinguiſh it from all other points.

Adſcendens. Synonymous with *incurvus.*

Adverſorum foliorum paginæ ſuperiores, a directione quâ inſeruntur ratione caulis, verſus cœlum vertuntur, hinc quantum maximum lucis obtinentes: ut folia *Ulmi campeſtris*, *Linn.*

The definition of this term in *Amæn. Acad.* is exceedingly obſcure, and can be underſtood only from examples of it. All the *adverſa folia* I have ſeen were both *diſticha* and *obliqua*, according to the Linnean meaning of *obliqua.*

Æquata ſuperficies omnis inæqualitatis expers eſt: nec canaliculata, ſtriata, ſcrobiculata, punctata, &c.

I have found this term very uſeful: it differs from *planus*, in not requiring the part to be level, or in a rectilinear direction, but frequently occurs in round bodies; as in the peduncles of *Ixiæ.*

Alveolata pars depreſſionibus oblongis exaratur; ut totus *Liriodendri tulipifera*, *Linn.*

Aſſurgens

Aſſurgens ſcarcely differs from *adſcendens* or *incurvus*: it ſeems peculiarly proper to deſcribe the change which takes place in the poſition of the leaves of *Mimoſæ* and other ſleeping plants.

Axis. Synonymous with *Columella.*

Bina folia. Leaves inſerted in three very different ways may yet all be called *bina*: either when they are oppoſite, as in *Lamium*; faſciculated, as in *Pinus*; or approximated, as in the flowering branches of *Datura.*

Calathiformis. Bowl-ſhaped: hemiſphærical and concave. *Tab.* 5. *fig.* 5.

Calyx. Juſſieu, to whoſe judgement I pay the higheſt deference, contends that this term is the moſt proper for that involucrum, which in the natural order of *Liliaceæ* has hitherto commonly been called corolla. Among other reaſons he adduces the Linnean canon, that this part is a continuation of the cuticle of the plant. I very much doubt, however, if this really be true; for the ſpatha in this natural order ſeems to me the firſt expanſion of the cuticle, and the true calyx. A proper bractea will always be found at the baſe of the pedunculus, though in many genera it is hid between the inſertion of the leaves; but in *Hæmanthus* it is coloured, and very conſpicuous.

Campanulatus. Somewhat like the bell of a church; at the baſe more or leſs bellying out, with the rim a little recurved. *Fig.* 6.

Capreolatus. Synonymous with *cirrhoſus.*

Circinalis. This term is confined by Linné to deſcribe the manner in which the young ſpikes in the natural order of *Boragineæ*, and

the young leaves of *Filices*, are rolled up: it is then ſynonymous with either *involutus* or *revolutus*.

Colum. A common receptacle on which the ſeeds are inſerted in ſome pericarpiums: it is probably analogous to the placenta in animals, and very conſpicuous in the natural order of *Didynamia Angioſperma*.

Cotyliformis. This term differs from *acetabuliformis* in having ſtraighter ſides not incurved. *Tab.* 5. *fig.* 7.

Crateræformis. Somewhat like *calathiformis*, but not ſo much bellying out, and rather approaching to *infundibuliformis*. Fig. 8.

Cyathiformis. Like a wine-glaſs: more or leſs obconical and concave. *Fig.* 9.

I have found this, and all the other terms of which I have given figures, very uſeful in diſtinguiſhing ſome of the ſpecies of *Narciſſus* and *Erica*.

Declinatus. Bent down.

This term is rendered quite unneceſſary by *deflexus*, *recurvus*, and *reclinatus*, which expreſs the mode of flexion more preciſely.

Diſcus. The ſurface of any part excluding the borders.

So I would diſtinguiſh it from *Pagina*.

Elliptica pars longior quam lata eſt, marginibus medio lineis fere parallelis, extremitatibus plus minus ſemicircularibus, æqualibus.

Linné often confounds this term with *oval*.

Faſtigiatus, according to the two Linnean definitions, is ſynonymous with either *corymboſus* or *conicus*.

I now only uſe it for any part that is towering or lofty.

Favoſus.

Favoſus. Somewhat like a honeycomb.

This term will be found very uſeful in deſcribing the receptacles of the claſs *Syngeneſia.*

Flagellum. Profeſſor Giſeke wiſhes to diſtinguiſh a Caulis *ſarmentoſus* by this title: but I think two names for one part unneceſſary; and on the ſame principle I reject *Culmus*, *Scapus* and *Frons*, for *Caulis*, *Pedunculus* and *Folium.*

Hypocrateriformis corolla. I would diſtinguiſh this by its having the lower part of the limb perfectly horizontal with reſpect to the tube: not by the ſhortneſs of the tube.

Irregularis corolla. Having its parts differing in proportion.

The eſſential character of an irregular corolla ſeems to me to reſpect ſolely proportion. Many ſpecies of *Gladiolus* have all the diviſions of the corolla exactly alike, except the uppermoſt being a little more erect; and yet they are evidently irregular.

Lamina. I always, with Forſkäl, deſcribe the upper part of a petiolated leaf by this term. *Limbus* I confine to corolla, even in polypetalous as well as monopetalous flowers.

Lenticularis. Plus minus ſphæricus margine acuto; inſtar ſeminum *Dracænæ enſifoliæ*, *Linn.*

Ligulatus. Somewhat linear, and much longer than broad.

Lyræformis. Figura ſuperne ſemiovalis, inferne anguſtior lateribus lineâ plus minus arcuatâ exciſis.

The flowers of *Ixia grandiflora*, *Roch.* afford an example of this term.

Marceſcens. Not falling off after it is withered; in which ſenſe Lœfling uſes it.

Medioliformis. Somewhat globular and truncated at both ends, like the nave of a wheel.

The tube of *Cynogloſſum omphalodes*, *Linn.* is an inſtance.

Meniſcoideus. Somewhat globular, with one ſide concave.

Nitidus. Synonymous with *lucidus*.

Obliquus. Aſlant: cut away in a ſloping direction, like the flowers of *Vinca* and leaves of *Begonia*.

Linné has defined this term very differently, and has given for examples of his meaning the leaves of *Protea* and *Fritillaria*: theſe leaves, however, may be more properly called *torta*; and he himſelf ſometimes uſes *obliquus* in the ſenſe I have given to it above.

Pagina. The whole ſurface of any part, including the border.

Papillaris. Somewhat like a nipple.

I think this term ſhould be diſtinguiſhed from *verrucoſus*. *Papilloſus* ſounds too like *papuloſus*.

Perſiſtens. Continuing a long while green with reſpect to the other parts of the ſame flower or plant.

Poculiformis. Hollow and cylindrical with an hemiſphærical baſe, the ſides at the top ſtraight, and not recurved. *Tab.* 5. *fig.* 10.

Priſmaticus. Synonymous with *triqueter*.

Recepta-

Receptaculum. The common ſupport or baſe of more flowers than one: it is a very important part in the claſs *Syngeneſia.*

Reclinatus. Curved firſt in a convex, then in a concave line; like the leaves of many ſpecies of *Erica.*

Scrobiculata pars depreſſionibus majuſculis ſuborbicularibus excavatur; ut colum *Trientalis europeæ, Linn.*

Spiralis linea uno pluribuſve circulis ſenſim elevatur.

The different parts of vegetables may be either ſpirally inſerted, like the flowers of *Ophrys ſpiralis, Linn.* or ſpirally directed, like the leaves of *Coſtus ſpecioſus, Smith.*: or they may ſpirally extend themſelves, like the ſtem of *Valliſneria paluſtris, Linn.*

Strophiola. A fungous or callous appendage placed about the hilum in the ſeeds of many genera: it is very ſingular in ſome of the ſpecies of *Mimoſa* and *Glycine* from New Holland.

Tortum folium. More or leſs twiſted.

Twiſted parts ſhould be accurately diſtinguiſhed from *ſpiral* parts, though the ſame direction occurs in both: but in the former the axis of the ſpiral line is in the parts themſelves; in the latter quite diſtinct, or out of them.

Torus. The common ſupport, or baſe, of the different parts of a ſimple flower.

In many flowers it is very ſmall, and entirely hid by the parts inſerted upon it; but in *Ranunculus, Paſſiflora, Magnolia,* and many other genera, it becomes very conſpicuous.

Trapeziformis. An area with four unequal ſides.

Trochlearis.

Trochlearis. Pulley-ſhaped, or like a cylinder that is narrowed in the middle.

The embryo of *Corypha* is an example of this term.

Turbinatus. Top-ſhaped: it only differs from Pear-ſhaped in being ſhorter, and more ſuddenly attenuated at the baſe.

Verrucoſus. Covered with rough tubercles like warts.

EXPLANATION OF THE FIGURES.

TAB. V. fig. 4. Corona acetabuliformis Narciſſi Radiiflori, *Saliſb. Prodr.*

5. Corona calathiformis Narciſſi Grand-Citronier, *Floriſtarum.*

6. Flos campanulatus Scillæ campanulatæ, *Soland.*

7. Corona cotyliformis Narciſſi patellaris, *Saliſb. Prodr.*

8. Corona crateræformis Narciſſi ampli, *Saliſb. Prodr.*

9. Corolla inferne cyathiformis Apocyni Androſæmifolii, *Linn.*

10. Corona poculiformis Narciſſi poculiformis, *Saliſb. Prodr.*

XIV. *Account of a Cavern diſcovered on the North-weſt Side of the Mendip Hills, in Somerſetſhire.*

By George Smith Gibbes, M. B. F. L. S.

Read April 2, 1799.

PERHAPS the following account of a cavern which I viſited ſome time ſince may be acceptable, as we there ſee the proceſs going on, which Nature employs to encloſe foreign ſubſtances in the hardeſt rocks.

At the bottom of a deep ravine on the north-weſt ſide of the Mendip Hills, in Somerſetſhire, near the little village of Berrington, there has been diſcovered a cavern of conſiderable extent, in which was found a great collection of human bones.

As I have obſerved in this cavern many circumſtances which appear curious to me, I beg leave to mention them, as I do not believe there is another place in the kingdom where the different ſtages (if I may be allowed the expreſſion) of bones incorporating with limeſtone rocks can be ſo well ſeen. From the top and ſides there is a continual dripping of water, which being loaded with a large quantity of calcareous earth, depoſits a white kind of paſte on moſt parts of the cavern. Many of the bones are incruſted with this cement, and a large proportion of them are actually fixed in the ſolid rock. I ſuppoſe therefore that this ſubſtance, which at firſt is in a ſtate reſembling mortar, by loſing its water hardens into a firm and ſolid

ſtone. I had an opportunity of examining the proceſs in every part. Had the cavern not been diſcovered, and theſe depoſited ſubſtances not been removed, I do not doubt that the whole excavation would, in no great length of time, have been completely filled up. The water was ſtill bringing freſh quantities of calcareous earth, and the bones were in ſome places completely incorporated with the ſolid rock. Every degree of intermediate ſolidity was plainly diſcernible. There were ſeveral nodules of ſtone, each of which contained a perfect human ſkull. The ſubſtance which is depoſited from the water effervesces with acids, and has, in ſhort, every character of limeſtone. At the farther end of this very curious cavern, where the height is about fifteen feet, there depends a moſt beautiful ſtalactite, perfectly conical, which, when the cavern was firſt diſcovered, reached within an inch of a cone of the ſame kind which riſes from the floor. By ſome accident a ſmall part of the ſtalactite was broken off; but Nature is now buſy in repairing an injury which had been done to one of the prettieſt productions of her mineral kingdom. Had theſe two cones met, a moſt beautiful column would have been formed, of nearly fifteen feet in height. On ſtriking this ſtalactite, a ſound is produced ſimilar to that of a bell, which may be heard at a conſiderable diſtance beyond the mouth of the cavern.

I examined the bones with conſiderable attention, and I found that there was adhering to the ſurface of many of them, a ſubſtance which reſembled the ſpermaceti I have before deſcribed, in the Philoſophical Tranſactions for the years 1794 and 1795.

I have to add, that this cavern was diſcovered about two years ago by accident, and that no ſatisfactory reaſon has been given for this ſingular accumulation of human bones.

XV. *Re-*

XV. *Remarks on the Nature and Propagation of marine Plants.* *By Lieut. Col. Thomas Velley, F. L. S.*

Read May 7, 1799.

HAVING, in a former inquiry into the mode of propagation peculiar to marine plants, attempted to point out ſome material errors, which accompanied the theories of Gmelin and Gærtner, by proving, that the membranaceous *Fuci*, which the former conſidered as merely proliferous, derived their origin from actual ſeeds; and that the numerous tribe of *Confervæ*, which Gærtner, upon a very ſlight and ſuperficial examination, has dogmatically declared to be deſtitute of ſeminal increaſe, were beyond a doubt dependent upon the ſame general law of Nature, for their propagation, as the *Fucus*: I ſhall now lay before this Society ſome further obſervations upon the ſubject, ariſing principally from an examination of the recent theories that have very lately made their appearance in the world. It may not however be foreign to the purpoſe, to inveſtigate the definition of the generic character prefixed by Linnæus to the *Fucus*, and which does not appear to be clearly ſtated.

In the *Genera Plantarum* he defines the ſuppoſed male flower as follows: "Veſiculæ glabræ, cavæ, pilis intus aſperſæ;" rendered by the Lichfield Society, "Veſicles ſmooth, hollow, ſprinkled with hairs within;" and in the *Nereis Britan.* "Bladders ſmooth; hollow, interſperſed within with ſoft hairs." Linnæus, however, cautiouſly introduces this definition upon the authority of Reaumur;

he disclaims all pretensions to the discovery upon which it is founded, and moreover asserts, in the *Philosophia Botanica*, that the florescence of the *Fucus* had been first brought to light by that author. Now Reaumur in no instance admits that the male flowers are contained in the air-bladders. On the contrary, he positively maintains that the pencilled clusters of fine hairs, spread on the surface, are the male flowers exclusively. Whatever ambiguity, therefore, may be attached to the word "vesiculæ" as applied by Linnæus, or however he may have varied his mode of expression at different times, still we are to recur to the account of the discovery, as stated by Reaumur, for the real import and meaning which ought to have been conveyed in the definitions of Linnæus; since on that alone his doctrine of the male flower appears to rest. The description cited above from the *Genera Plantarum* seems evidently to relate to the air-bladders in the *Fucus vesiculosus*, and has induced some authors to consider the fructification as confined to those parts*;—while others again, pursuing the same opinion, and who at the same time adopt the doctrine of Reaumur and Donati, that the pencilled clusters of hairs, scattered over the surface of the frond, are the male flowers, will find themselves reduced to the necessity of admit-

* In the last edition of the *Botanical Arrangements* it is observed, under *Fucus vesiculosus*, that "the bladders in the substance of the leaf contain the fructification." Dr. Withering, agreeably to the method which he has constantly pursued throughout that valuable work, very properly produces the authority of Linnæus in support of the above opinion. In the same work, the *Fucus serratus* is also noticed as having "two kinds of fructifications sufficiently obvious;" *i. e.* the seed-vessels in the summits, and the clusters of fine hairs externally situated. But it must not be passed over, that the same appearances *are equally obvious* on the *Fucus vesiculosus* and all its varieties. Admitting therefore that the male flowers are contained in the air-bladders, the *Fucus vesiculosus* must of course have *three* distinct parts of fructification; one exposed, another concealed, and the third in the summits (universally admitted) producing the seeds.

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ting two different males, on the ſame plant, operating in a manner not only diſtinct from, but directly oppoſite to, each other: for one of them (as we have juſt ſeen) is deſcribed as internally ſituated and concealed in the air-bladders, while the other is external and expoſed to view in thoſe ſmall open veſſels upon the ſurface of the plant*. But ſuch an œconomy does not appear to have proof or analogy

* My friend Mr. Stackhouſe had adopted the ſame opinion in his very ingenious inveſtigation of theſe plants, and mentioned "the monœcious character as clearly diſcernible in ſome" of the *Fuci*; as alſo the twofold ſtate of the male flowers, one of which is repreſented as externally ſituated, and expoſed to view in the urceolate veſſels; the other, concealed in the air-bladders—"*in interiore veſicularum grandiorum.*" In a ſubſequent faſciculus he informs us, with that true ſpirit of candour which directs his reſearches and entitles them to the moſt reſpectful attention, that the doctrine of a monœcious character muſt be totally abandoned, ſince upon a more critical and attentive examination he finds "the previous fructification is effected *internally*." This laſt point being admitted, there hardly remains a ſhadow of difference between our reſpective opinions, as far as relates to the propagation of this curious tribe of plants. I muſt obſerve, however, that as I could not in the firſt inſtance attribute to thoſe capillary veſſels the important function which belongs to a ſtate of floreſcence, ſo neither can I reconcile myſelf to a contrary extreme, "that thoſe filaments might be nothing more than an exuding mucus"—admitted in the ſecond faſciculus of *Ner. Brit.* p. 13. This opinion is taken up principally upon the diſappearance of thoſe fine hairs when immerſed in water; as if they at once became reſolved into a mucous fluid. But the fact is, they ſtill remain in the ſame unaltered ſtate, and may be diſcovered in the aquatic microſcope in a ſtrong light during their immerſion. Their extreme tenuity and minuteneſs may cauſe them to collapſe, and adhere to the ſurface of the plant; and their tone of colour, which may aſſimilate itſelf to that of water, will no doubt render them difficult to be ſeen. Theſe pencilled cluſters are repreſented in the firſt plate and faſciculus of the *Ner. Brit.* in their urceolate veſſels. If they were deſtined to carry off the mucus, they would not be excluded from the internal maſs by thoſe callous veſſels in which they are confined. If they were part of the fluid, they would be of very different lengths. Beſides, theſe filaments exiſt when the plants are in their firſt and moſt tender ſtate (as I have obſerved upon a former occaſion), and before they produce the leaſt appearance of mucus. This fluid is not conſtantly produced, and principally abounds in a ſtate of maturity. In ſummer time it may ſometimes be ſeen

 before

analogy to ſupport it, throughout the whole vegetable creation. The locality of two ſuch bodies demonſtrates their reſpective functions to be diametrically oppoſite; for, while the favourite idea of floreſcence may ſuggeſt the poſſibility of external communication, between the minute filaments on the ſurface and the fructified ſummits which contain the ſeeds, the ſituation of the ſecond flower in a bladder, ſo impervious as to retain its internal air, neceſſarily excludes the poſſibility of a groſſer body eſcaping externally through ſuch a ſubſtance. Should it be aſſerted, that the fecundating principle therein contained may be of ſo pervading a nature as to find an internal courſe through the ſolid coriaceous texture of the frond itſelf, although, for reaſons which I ſhall hereafter aſſign, I cannot admit that it exiſts in thoſe bladders, yet I concur in the general principle. It is what I have chiefly endeavoured to point out in my former tract upon this ſubject. If then, to uſe the expreſſion of the ingenious author of the *Nereis Britannica*, "the impregnation may be effected by a ſubtile vapour," in other words, by ſome unknown operation, the fact ſeems highly probable. This is "that ſelf-inherent principle" which I before aſſerted to exiſt; and upon the apparent œconomy and wiſdom of the Divine Author, "who has admirably tempered the conſtituent principles of natural bodies in ſuch due proportions as might beſt fit them for the ſtate and purpoſes they were intended for*." But then we ought not, upon mere hypotheſis, to wreſt ſuch hidden faculties (for unknown ſurely they are) from their inſcrutable courſe, and arbitrarily aſſign their effects to the ſuppoſed

before it is diſengaged from the frond; and then it forms a very curious dépôt immediately under the ſurface, appearing like diſtinct globules extremely minute. In this ſtate I have ſeen it in very thin tranſverſe ſections of the *Fucus ſaccharinus* under the microſcope. At firſt ſight I flattered myſelf I had diſcovered the ſeeds of that *Fucus*.

* Hales.

mechanical

mechanical operation of parts, which are neither calculated to promote, or capable of communicating, thoſe reciprocal functions which reſult from a ſtate of floreſcence.

It has been juſtly obſerved by one of the greateſt philoſophers of the preſent age*, "that Nature though varied is generally uniform in her operations." The more we contemplate the extenſive volume which ſhe preſents to our view, the more this obſervation will become confirmed: but while it tends to vindicate the exiſtence of a principle equivalent to, as I have before maintained, though differently modified from, that which directs the ſexual ſyſtem, it cannot reconcile itſelf to the aſſumption of two diſtinct males acting by different proceſſes in the ſame plant, any more than it can admit either of thoſe bodies ſeparately to conſtitute a ſtate of floreſcence, when, from their permanent and unchangeable nature through all the ſucceſſive periods of the plant's exiſtence, as well as from their relative ſituations, they militate againſt every law of analogy, as far as reſpects the Linnean ſyſtem.

Linnæus, when he maintains the univerſal influence of the laws of floreſcence over the vegetable world, cloſely defines the preciſe character of the flower itſelf, aſſerting, that its very eſſence exiſts in the ſtigma and antheræ, which, connected with the pollen containing the fertilizing vapour, can alone conſtitute a ſtate of floreſcence; and that, without theſe eſſential parts, even the bloſſom with its exterior appendages could not in any reſpect be conſidered as a flower.

The uniformity and mechanical exactneſs which directs the ſources of vegetable impregnation, throughout the immenſe ſeries of terreſtrial plants, could not fail to attract the admiration of the recent votaries to the ſexual ſyſtem. Strengthened in their opinions

* Sir William Hamilton.

by

by the general conformity of the laws of Nature, and exulting in the confutation with which modern diſcoveries had overwhelmed the former prevailing theories, it is not matter of ſurpriſe that they ſhould have eſtabliſhed the laws of floreſcence upon ſo ſtrict a dogma. Science, too long inſulted by the prepoſterous tenets of equivocal generation, had already turned away in diſguſt from the ancient writers, who favoured that ill-founded doctrine. The principles of vegetable life now became the object of philoſophical diſcuſſion; and the important diſcovery of Harvey, which had long ſince brought to light the circulation of the blood, ſeems, by an eaſy tranſition, to have directed the reſearches of Hales towards a ſimilar principle in vegetable bodies; when, at length, the propulſion of the ſap became beautifully exemplified by his unerring ſtaticks. Every day brought forth new diſcoveries; and thoſe plants which had apparently furniſhed the ſtrongeſt arguments to the opponents of the ſyſtem, were now compelled to diſcloſe their myſterious œconomy, and, by exhibiting the hidden ſources of their impregnating powers, ſeemed at once to eſtabliſh the univerſal extent of the newly eſtabliſhed doctrine. When Linnæus firſt announced the diſcovery of ſeeds in the Moſs, was it to be expected that he ſhould withhold his credit from the floreſcence of the *Fucus*, when brought to light by one of the moſt reſpectable philoſophers of his day? The floreſcence however of the *Fucus*, as it is ſtated in the *Nereis Britannica* to exiſt, derives no ſupport from that of the ſubmerſed plants. On the contrary, the latter tend to eſtabliſh a ſtrong argument againſt the abovementioned theory. Almoſt all thoſe aquatic plants that are fertilized by actual pollen, a ſubſtance known to be immiſcible with water, emerge at the time of their impregnation. Let us examine, as next in ſucceſſion, the very few which do not emerge. And firſt the *Iſoetes* ſeems to preſent itſelf, whoſe flower

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is ſo carefully enveloped with an impenetrable barrier, formed by the concave poſition of the leaves, that the pollen is enabled to convey its fertilizing vapour in an element, which by contact would obſtruct the progreſs of fecundation. The genus *Chara* ſeems to indicate an approach towards that terminating point, where the mechanical floreſcence ceaſes at length to act. Some reſpectable authors, and Haller among the number, do not admit that the ſuppoſed antheræ can be inveſted with the faculty of impregnation, becauſe they are permanently included in an impervious part of the plant. Hedwig, who has defined the floreſcence of this genus with great preciſion, acknowledges himſelf to be totally at a loſs to account for that operation, becauſe the ſpherical veſſel, in which the antheræ* are included, has no external communication with the approximating germ. It is very probable, however, that the veſſel alluded to may, from its contiguity to the lower part of the germ, convey thither, at the point of contact, the impregnation by an internal proceſs. A very ſlight compariſon will at once diſcover the total want of ſimilitude in ſtructure, ſituation, and œconomy, between the veſſels of the *Chara*, in which the fecundation appears to be carried on internally, and thoſe air-bladders in ſome of the *Fuci*, ſuppoſed to be the reſidence of the male flower.

Enough has already been ſaid upon the Linnean ſtate of floreſcence. We have a clear and reſtricted definition of its conſtituent parts, while its laws are found to accord with ſurpriſing uniformity through all the various claſſes, which were formed by the great founder of the ſyſtem. Yet there is a point where its accuſtomed mechaniſm ceaſes to act; where the nature and agency of its impregnating powers undergo a material change. And here ſurely we may pauſe, to contemplate the verſatile power by which Nature is

* *Theor. Hedw.* p. 129.

enabled

enabled to vary, without diſuniting, the general principles of her eſtabliſhed laws. "She diſdains," as Mr. Lightfoot has finely obſerved, "to be limited by the ſyſtematic rules of human invention. She never makes any ſudden ſtarts from one claſs or genus to another, but is regularly progreſſive in all her works, uniting the various links in the chain of beings by inſenſible connections."

We have lately ſeen this myſterious ſubject diſcuſſed by no ordinary inveſtigator of Nature's laws*. The principle upon which this diſcerning naturaliſt proceeds, appears to be well founded; and if he fails in any reſpect, it is by overſtraining his theory to make it quadrate with the Linnean doctrine of floreſcence. From this circumſtance principally, he has, in my opinion, expoſed his argument to ſome objections which may not eaſily be removed. He commences his eſſay with a conciſe and perſpicuous ſurvey of the exiſting theories laid down by Reaumur, Gmelin, and Gærtner. And as the two laſt of thoſe authors maintain that a very numerous branch of the *Algas* do not in any inſtance derive their origin from ſeeds, but ſolely from proliferous gems, or buds, he oppoſes the doctrine with much ingenuity; not grounding his opinion merely upon the laws of analogy, but upon a ſcientific and an anatomical inquiry into the natural ſtructure and conſtituent parts, as well as ſituation, of theſe corpuſcles.

Having, as far as the nature of the ſubject would admit, eſtabliſhed theſe points ſo conſonant with ſound philoſophy, he proceeds to account for that peculiar proceſs to which the ſeeds themſelves owe their origin; and this he conſiders as an actual ſtate of floreſcence. "If pollen," continues this author, "under the ſhape of farina, be unfit for fecundation in the water; if Nature has taken

* Mr. Correa de Serra on the Fructification of the ſubmerſed *Algæ*, in The Philoſophical Tranſactions for the year 1796, p. 494.

a particular

a particular care to guard this operation from the preſence of that element; if pollen can exiſt in an active ſtate under a mucous appearance; and if the antheræ of perfectly ſubmerſed flowers are nothing elſe than cloſed veſſels filled with mucous pollen; what doubt can we entertain, that the mucilaginous veſicles of the ſubmerſed *Algæ* (which contain alſo their ſeeds) are antheræ?"

I ſhall now briefly conſider this theory of floreſcence, as taken up upon the principles eſtabliſhed by Linnæus, and explained in the technical language of that author. It may perhaps ſcarcely be worth while to obſerve, that Mr. Correa de Serra, at the beginning of the above paſſage, appears to make a diſtinction between the terms *pollen* and *farina*, which in fact are merely ſynonymous. Pollen, as explained by Linnæus in the *Philoſophia Botanica*, ſeems to have a reference to the exterior form and appearance of the body itſelf, more than to the fecundating vapour or power contained within it, to which it acts principally as a vehicle *. This part of the flower being almoſt univerſally found under a farinaceous form, is diſtinguiſhed by the appropriate term *pollen*, which implies a fine meal. Waving therefore any objection that might be raiſed againſt the expreſſion "mucous pollen," I cannot paſs over a ſubſequent remark, in which the faculty of impregnation is attributed to the part containing the ſeeds; and the province of the antheræ, ſo diſtinctly preſerved in the ſexual ſyſtem, is nearly blended with that of the ſeed-veſſel. The paſſage alluded to is the following: "What doubt can we entertain, that the mucilaginous veſicles of the ſubmerſed *Algæ* (which contain alſo their ſeeds) are antheræ?" In ſhort, if the reproduction of theſe plants is to be elucidated by the Linnean theory of floreſcence, and its concomitant terms, eſpecial care ſhould be

* Generationem vegetabilium fieri mediante pollinis antherarum illapſu ſupra ſtigmata, quo rumpitur pollen, efflatque *auram ſeminalem*, quæ abſorbetur ab humore ſtigmatis. *Ph. Bot.* ſect. 145.

taken to preſerve a ſtrict connection, and uniform correſpondence, between the parts deſcribed, and the definitions by which the theory is ſupported. Gærtner, in his remarks upon ſome of the *Fuci*, finding that their fecundation was effected by an internal proceſs, maintains likewiſe, that the part containing the ſeeds is alſo endued with the faculty of impregnation. But this author gives an unphiloſophical and a fanciful caſt to his hypotheſis, in adopting an uniſexual diſtinction, when he ſuppoſes that the female organ impregnates itſelf, or rather, the ovula which it contains——"quod ipſe uterus ſua fœcundet ovula, et quod ille ipſe officia genitalium utriuſque ſexûs, præſtet ſolus."——Upon examining the mucilaginous veſicles (or, ſtrictly ſpeaking, the diſtended ſummits) in which the ſeeds are placed, and conſidered alſo by Mr. Correa de Serra as the antheræ, it will appear that the ſeeds are very ſeldom fixed in a looſe and naked ſtate, but contained in minute hard coriaceous tubercles, on all ſides impervious*, and moſt firmly attached to the interior ſurface of the ſummit, in the veſicular *Fuci*; and that in theſe tenacious tubercles the ſeeds may frequently be diſcovered long before the ſolid cellular maſs becomes changed into a mucilaginous ſubſtance. Again, in ſeveral ſpecies, the central ſubſtance, in which the ſeeds or pericarps are placed, always remains in an invariably ſolid ſtate, and is never converted into mucilage. This is decidedly the caſe in the *Fucus ſerratus* †, and I never found it otherwiſe in the *Fucus nodoſus* and ſome others; and yet the ſeeds of both thoſe plants are produced in the ſame manner as in the *Fucus veſiculoſus*. From theſe facts there is great reaſon to conclude, that the mucus, which is found at certain ſeaſons in ſeveral of the *Fuci*, is not eſſentially neceſſary to their impregnation. And as it ſeems to abound moſt in

* See the horizontal ſection of one of the ſummits of *Fucus veſiculoſus*, in which the tubercles or pericarps are repreſented. *Vell. Marine Plants*, plate 1.

† See an horizontal ſection of this *Fucus* magnified, *Marine Plants*, plate 1.

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the mature plants, I am induced to ſuppoſe that it may be a kind of ſuppuration brought on by age, and poſſibly may be inſtrumental in facilitating the eſcape, or diſperſion, of the ſeeds.

A plauſible remark in favour of the hypotheſis is urged by the ingenious author in the following words; "The pollen of any flower, when put into water, in a very ſhort time begins to move; and its particles agitate themſelves in every direction, perfectly reſembling the moſt lively animalcula. Their activity in this ſtate laſts ſome time; but if the leaſt quantity of ſalt be put into the liquor, death quickly enſues, from which they never more recover. This incloſed mucilaginous fructification was therefore the only one which could enſure exiſtence to vegetables living chiefly in ſea-water, with which their mucus is found to be immiſcible."

It is very far from my intention to miſrepreſent the meaning of the paſſage. It ſtrikes me, as alluding to a proviſion which Nature has made to protect the impregnating body from the deleterious effect of ſaline particles (which would at once deſtroy the active principle of pollen), by fixing it in a menſtruum which is immiſcible with ſea-water. The ſuppoſition is ingenious. Yet is Mr. Correa de Serra aware, that this very mucilage is not free from the infection of ſalt;—that ſaline particles may frequently be found upon the ſurfaces of dried ſpecimens;—that in diſſections under the microſcope ſimilar appearances may be diſcovered, which ſuddenly ſhoot into minute cryſtallizations;—and that it is owing to this ſaline quality which ſeems intimately combined with the very texture and conſtituent parts of the *Fuci*, that they poſſeſs the property of an hygrometer for years after they are dried*?"—From theſe circumſtances it

* I am induced, from an obſervation of Mr. Lightfoot, to attribute this circumſtance to the natural quality of the frond, rather than to the effect of the ſea-water in which it grew. That author remarks, that if the *Fucus ſaccharinus* be ſoaked in freſh water, then dried

it appears to be highly probable, that the pollen of marine plants, if ſuch a body in reality may exiſt in the mucilage, muſt be totally different in its quality from the pollen which carries on ſo important a function in the ſexual ſyſtem: it muſt alſo be totally different in its ſubſtance, becauſe it is not to be diſcovered by the greateſt magnifying powers.

But, giving the utmoſt ſcope to the hypotheſis, and admitting that this mucous pollen is attendant upon all the marine plants, either internally or externally; ſtill it muſt contain ſome ſubtile vapour, capable of paſſing through the coriaceous texture either of the tubercular pericarps or of the frond. And after all, what does this amount to? Nothing more than that ſome undefined vivifying principle, reſident in the internal ſubſtance of the plant, brings on a ſtate of impregnation, and anſwers every purpoſe which the more obvious mechanical laws of floreſcence produce externally in an atmoſphere, where no impediments exiſt to render their proceſs abortive.

After what has been already advanced, it may appear almoſt ſuperfluous to produce any further arguments againſt the floreſcence ſuppoſed to be concealed in the inflated parts of the veſicular *Fuci*. I ſhall therefore only briefly add, that the *Fucus ſerratus* is entirely deſtitute of the air-bladders, and yet produces its fructification in a ſimilar manner to the *Fucus veſiculoſus*; but the advocates for floreſcence may attribute the impregnation to the ſmall external filaments ſo often noticed. *Fucus ſiliquoſus* and *F. nodoſus* are perfectly free from thoſe minute faſcicles; but then again the impregnation may poſſibly be aſcribed to the tracheæ in the veſicles or inflated leaves. What then remains to be ſaid of the *Fucus canaliculatus*,

dried in the ſun, and afterwards depoſited, it will in a ſhort time be covered with a white efflorescence of ſea ſalt.

which is entirely deſtitute both of the veſicles and the external filaments, and yet produces its ſeeds in a manner exactly ſimilar to that before deſcribed?——In ſhort, as the means by which Nature conducts her operations are always appropriate to her ends, we may conclude, that if the fine veſſels or fibres in the veſicles had any immediate reference to a ſtate of floreſcence, they would either be extended throughout the internal ſubſtance of the frond, to carry on their ſecret and ſubtile operation; or would be furniſhed with ſome external apparatus, which might give colour and ſupport to the hypotheſis.

A particular deſcription of the air-bladders, or veſicles, which form a curious part in the ſtructure of ſeveral of the *Fuci*, will cloſe theſe remarks. It might naturally occur to any caſual obſerver, that the veſicles alluded to could not be formed, if they had not ſome means of collecting and retaining a greater portion of air than that which may exiſt in an equal given ſpace of the ſolid frond. Nature therefore ſeems to have furniſhed them with numerous tracheæ or air-veſſels, ſurpaſſing in tenuity the fineſt hair. Theſe are a combination of fibres inoſculated together, which proceed from the cellular ſubſtance, and freely exert their elaſtic influence from the interior ſurface of the cavity. They may be found in all the inflated *Fuci*; and as they are very ſimilar in their appearance, ſo, probably, they may be in their œconomy, to that fine woolly ſubſtance which is found at the broken ends of ſome leaves, and which the learned Grew has pronounced to be a ſkein of air-veſſels. Theſe capillary veſſels in the bladders of the *Fucus* probably contribute their aid to dilate and extend that part of the frond into its oval and veſicular form; and bring part of that elaſtic fluid into action, which is well known to exiſt in all plants without exception. Since this paper was written a remark has made its appearance, in a very valuable work

work upon the ſubject of the *Fuci**, which attributes the formation of thoſe fine veſſels to the laceration of the internal ſubſtance, as the ſides become dilated into the air-bladders. An examination of theſe ſlender threads under the microſcope will probably induce the obſerver to entertain a different opinion. If they originated from the cauſe ſuppoſed, they would appear in a lacerated unconnected ſtate; and, being formed from the broken maſs, could never be ſo curiouſly anaſtomatiſed one with another: neither would the relaxed and diſſolved contents be drawn out into tubular and jointed forms. Beſides, theſe capillary veſſels generally dilate at the point of inoſculation, forming a kind of joint, in an uniform manner. It is very difficult to conceive that a texture ſurpaſſing in tenuity the fineſt web, and at the ſame time ſo curiouſly organized, ſhould be produced by a general revulſion of the expanding maſs.

* See *Tranſactions of the Linnean Society*, vol. iii. p. 91, 92.

XVI. *De-*

XVI. *Deſcription of Sowerbæa juncea, a Plant of New South Wales.*

By James Edward Smith, M. D. F. R. S. P. L. S.

Read July 2, 1799.

THE eſſential character of the genus of *Sowerbæa* is already publiſhed in the fourth volume of the Linnean Society's Tranſactions, p. 218, as follows:

Corolla infera, hexapetala. *Filamenta* tria, biantherifera, ſterilibus tribus interſtinctis.

It belongs to the Order of *Aſphodeli* of M. de Juſſieu, and ſhould be arranged in the ſame ſection with *Allium*. One part of the character of that ſection, *radix bulboſa*, requires however to be omitted, as being neither neceſſary to diſcriminate *Allium*, nor applicable to the genus before us.

Sowerbæa is ſtrikingly diſtinguiſhed from every plant of the ſame natural order by having two antheræ upon each filament, each of which conſiſts of two cells, and burſts by two pores at the top. Between the filaments which bear antheræ, three ſhort blunt barren ones are inſerted. The antheræ ſeparately conſidered agree in ſtructure and manner of burſting with M. de Lamarck's genus of *Dianella, Juſſ. Gen.* 41; but in that each ſtands on its own filament, and the fruit moreover is a berry.

In the Linnean Syſtem *Sowerbæa* muſt be placed between *Aphyllanthes* and *Allium* in *Hexandria Monogynia*; for every analogy, as well

well as the ſtructure of its parts, proves it to be truly hexandrous, though at firſt ſight it might ſeem triandrous.

We are as yet acquainted with but one ſpecies of this genus, diſcovered by Mr. White near Port Jackſon in New South Wales, and now not unfrequent in the nurſeries about London. It requires the ſhelter of a greenhouſe, and thrives beſt in bog earth with a conſiderable degree of moiſture. It may be named

SOWERBÆA JUNCEA.

Root of many long ſimple fibres.

Herb ſmooth.

Leaves radical, ſheathing, upright, linear, ſharp-pointed; channelled above; convex beneath.

Stipula within the leaf, ſimple, white, membranous, obtuſe, concave.

Stalk ſolitary, taller than the leaves, erect, ſimple, naked, round, ſmooth, ſolid.

Umbel terminal, many-flowered, ſpreading.

Bracteæ ſeveral, ovate, coloured, ſhorter than the umbel.

Flower-ſtalks ſimple, thread-like, ſingle-flowered, naked.

Calyx none.

Petals ſix, equal, ovate, pale purple, ſpreading, permanent.

Filaments ſmooth, greeniſh.

Antheræ yellow.

Germen ſuperior, roundiſh, ſmooth, with three principal furrows and three ſmaller intermediate ones.

Style erect, rather longer than the ſtamina.

Stigma ſimple.

Capſule

Sowerbæa juncea

Capſule of three cells and three valves, the partitions from the middle of the valves.

Seeds one or two in each cell, angular, blackiſh.

The herb when bruiſed has no peculiar ſmell, and is totally deſtitute of any flavour of garlick. The flowers alſo are without ſcent.

TAB. VI. repreſents the *Sowerbæa juncea* of its natural ſize.

Fig. 1. The ſtamina and piſtillum.
2. 2. Barren filaments.
3. Germen and ſtyle.
4. Capſule magnified, cut tranſverſely.
5. A ſeed.

XVII. *An Account of the Fructification of Lycopodium denticulatum.*

By Félix Avellar Brotero, Professor of Botany in the University of Coimbra, F. M. L. S.

Read July 2, 1799.

LYCOPODIUM DENTICULATUM.

L. FOLIIS imbricatis, ovatis, mucronatis, caulibus repentibus, dichotomis ramosissimis; spicis assurgentibus, monoicis.

L. foliis bifariis, superficialibus imbricatis; surculis repentibus, floribus sparsis. *Linn. Syst. Veg.*

Muscus denticulatus et fœniculatus Dalechampii. *Grisley Vir. Lusi.* n. 1041.

Muscus terrestris Lusitanicus. *Clus. Hist.* 2. *p.* 249.

Idem. *J. Bauh. Hist. Pl. vol.* 3. *p.* 757.

Muscus denticulatus minor. *Bauh. Pin. p.* 360.

Lycopodioides imbricatim repens. *Dill. Musc.* 462. *t.* 66. *f.* 1. A.

Lycopode denticulé. *Lamarck Encycloped. Meth.*

GERMINATIO. *Radicula* unica, simpliciſſima, capillaris, uncialis, pubescens, enata prima ex hilo trihiulco, seu ex basi subtrivalvi integumenti seminis aperta. Cotyledones duæ, ex vitello evolutæ, oppositæ, obovatæ, glabræ, patentes, semilineam latæ, unam

lineam longæ: ſcapus medius inter vitellum intectum et cotyledones evolutas, capillaris, glaber, erectus, tres lineas longus. Paucis exactis diebus, plumula apparet bifolia, foliolis ſublanceolatis, inter cotyledones decuſſatim oppoſitis; poſtea ad plumulæ ſinguli folioli baſin aliud ſimile exoritur, atque ex iſtorum duorum medio tertium alterum utrinque demum progerminat, quod ſenſim in ſurculum foliatum protenditur, ſicque ſcapus primordialis bifurcus tandem fit. Integumentum ſeminis cum vitello trihiulcum perſiſtit quoad uſque duo prædicti ſurculi ſeſquiuncialem longitudinem adipiſcantur. Decembri aut Januario in humo umbrosâ germinat.

Surculi ſetacei, ſubanguloſi, ſubſtriati, repentes, dichotomi, ramoſiſſimi, foliis tecti, tres ad ſex uncias longi, biennes, triennes et ultra, æſtate areſcentes, autumno humiditate revireſcentes; ramis ex gemma compoſita axillari exortis, patentibus, aut divaricatis; radiculis ad ramorum bifurcationes ſolitariis, ſetaceis, infernè dichotomis.

Folia omnia alterna, glabra, ex pallido-viridia, ſeſſilia, mucronata, obſoletè decurrentia, aliqua poſtice ad baſin gibboſiuſcula, ciliato-ſerrulata, denticulis minimis acutiſſimis (lente vitreâ conſpecta). In ramulis non fructificantibus quadrifario-ſecunda; lateralia, ſeu ſolo applicata patentia, contigua, ovata, acutiuſcula, plana, paulo ultra lineam unam longa, pauloque ſemilineam lata; ſuperficialia ovato-lanceolata, acutiora, triplo fere minora, obliqua, laxè imbricata; in dichotomiis ad radicularum exortum unum conſtanter ſolitarium, inferum. In ramulis fructificantibus quadrifariam laxè imbricata, alia etiam majora, minora alia, ovato-lanceolata, omnibus aliis acutiora, baſi concava, apice reflexo.

Ramuli fructificantes terminales, adſcendentes, ſæpius gemini, ſpicati, ſ. quaſi amenta. Flores axillares, ſolitarii, monoici.

Perichætium et *calyptra* in utrisque floribus nulla.

Flores masculi ad ramorum apices plurimi, ad viginti sex et ultra, inferne pauculi inter fœmineos nonnullos, seu interdum cum ipsis alternantes, superioribus præcociores. Anthera axillaris, sessilis, solitaria, obtusa, ex reniformi-cordata, primùm ex pallido-viridis, seu subrufa, demum saturate testacea, pistilli germine valde minor, unilocularis, bivalvis, (ut in Callitriche vernâ) calore, non vero humiditate verticaliter dehiscens; valvulis æqualibus, ovato-subcordatis, elastice pollen ad latera vibrantibus, diaphanis, valde porosis: grana pollinis numerosissima, ad tercenta, subæqualia, subglobosa, acutiuscula, lutescentia, colore ceræ, solida, minime neque siccitate neque in aqua dehiscentia, elastice desilientia, ad candelæ flammam a me applicata non inflammabilia.

Flores fœminei ad ramorum extremorum inferiora, aut interdum sub eorum bifurcationibus permulti, sed masculis sæpius numero minores, solitarii, axillares, sessiles. Germen ovatum, subtriangulum, obtusum, læve, nitidum, pedicello capillari minimo vix conspicuo adhærens, fossulis nonnullis, punctisque tuberculosis minimis, succulentis, vagis instructum. Stylus nullus. Stigma: rima, seu sulcus profundus in germinis basi, qua folio incumbit, utrinque ad latus pedicelli, liquore unctuoso diutissime perfusus, indies largior, persistens. Ovula etsi grandefacta adultaque oleo crasso plena, quod serò demum in vitellum solidum convertitur.

Capsula subsessilis, pedicello minimo capillari, non in baseos centro, sed hinc versus folium sito, imposita, trigona, seu conico-tricocca, obtusa, basi hinc versus folium emarginata, ex pallido-viridis, unilocularis, quadrivalvis, elastice per futuram sinûs inter semen superius et aliud oppositum rachi incumbens lateraliter dehiscens: valvulæ diaphanæ, basi coalitæ, (ad microscopium porosæ, papillosæ) duæ majores concavo-convexæ, margine revoluto, ovatæ,

obtuſæ, oppoſitæ; duæ aliæ triplo minores, oppoſitæ, majores decuſſantes, carinatæ, acutiuſculæ. Quæ capſulæ ad ramulorum inferiora ſitæ ſunt, citius matureſcunt ac dilabuntur.

Semina conſtantiſſime quatuor, globoſa, parietibus valvularum incumbentia, hili triangularis apice ad tuberculum minimum in capſulæ fundo, quâ pedicellus deſinit, ſitum laxe applicata; tria inferiora, quartum ſuperius ipſis impoſitum; inferiora duobus hili angulis lateralibus inter ſeſe cohærent, et tertio interno angulis tribus quarti ſeminis ſuperioris affiguntur; omnia elaſtice deſiliunt. Integumentum ſimplex luteo-ſulphureum, ſub-coriaceum, (ad microſcopium) ſcabriuſculum: albumen embryonem involvens nullum, ſed vitellum globoſum, integumenti magnitudine: embryo, ſeu plantula ſeminalis, vix conſpicitur. Semina plurima abortiunt; duo ſæpius paulo majora, fertilia, unum aliudve ex quatuor interdum exſuccum demum evadit.

Floret autumno, hyeme et primo vere.

Habitat ad aggeres umbroſos, ſubhumidos paſſim prope Conimbricam, ubi jam olim a celeb. Cluſio obſervatum, et alibi in Beira et Extremadura.

Tota planta inodora et inſipida eſt, quamvis a nonnullis leviter dulcis et aſtringens habita fuiſſet. Semina fertilia aquæ fundum petunt; omnia nitroſa, oleoſa, fulgurantia, ut illa Lycopodii clavati, quibus eſſe viribus medicis analoga probabile eſt.

Linnæi opinio, qui fulgurantia ſemina pro polline, et furculorum gemmas in Lycopodiis pro piſtillis et fructu habebat, jamdudum exploſa. Illuſt. Gærtner nullas antheras, ſed ſemina duplicis formæ in eadem ſtirpe Lycopodia ſæpe ferre, atque aphroditas plantas eſſe contendit.

Celeb. Adanſon etſi Lycopodiis antheras et piſtilla, ſeu capſulas, ſtylo

ſtylo ſtigmateque nullis, tribuat, attamen capſulas polliniferas cum ſeminiferis, ſeu fructum cum antheris confundere videtur, nam ſemina fulgurantia pro polline habet, ipſaque monocotyledonea exiſtimat, quod ex noſtri affinitate ſpecificâ non admittendum cenſeo. Clariſſ. Juſſiæus, De Lamarck, Schreber et alii ex recentioribus Botanicis nullam inter polliniferas et ovuliferas, ſeu ſeminiferas capſulas diſtinctionem ex ſtructura partium aliiſque botanicis notis deſumptam dederunt. Cæterum quod ad noſtrum Lycopodium denticulatum attinet, ortus, color, tempus florendi, ſitus, fabrica, commercium cum fœminis clare indicant capſulas illas ſubreniformes, corpuſculis ad tercenta plenas, verarum antherarum requiſita poſſidere, et ad veras antheras eſſe referendas. Ovaria, ſeu piſtilli germina et ovula ipſa ſemper longo temporis intervallo antheras et pollinis formationem præcedunt: inferiora priuſquam ſuperiora (ſicuti etiam antheræ) evolvuntur et matureſcunt. Cum in omnibus vegetabilibus, etiam e perfectorum tribu, non una eademque ſit organorum ſexualium, ſtigmatis polliniſque conformatio, (nam ex. gr. in Agyneja ſtigma eſt foraminulum in germinis apice ſexcrenatum, et in nonnullis Orchideis, Contortis, &c. pollinis granula ſolida ſunt) nil ſanè mirum emarginaturas pro ſtigmate taliaque pollinis granula Lycopodio noſtro a natura donari. Antheræ illæ pauculæ, quæ inferne inter prima ovaria ſitæ ſunt, priores pollinis granula explodunt; iſtorum aliqua in aerem et per ipſum ad vicinarum ſtirpium co-ſpecificarum ſpicas, alia ſupra germina propriora aut remotiora, alia in axillas foliorum et ſupra folia ipſa, unde ad ovariorum emarginaturas, ubi diu perſiſtunt, inferiorum deſcendunt: tunc ſperma tenuis liquoris ſpecie, ex granulis excretum per inſenſibiles futurarum, ſeu ovarii emarginaturarum poros abſorbetur, vaſa ad tuberculum, ſeu receptaculum minimum, cui ovula adhærent, deferentia permeat, et tandem ipſa fœcundat. Non ergo imprægnationem (quæ forte nonnullis placebit)

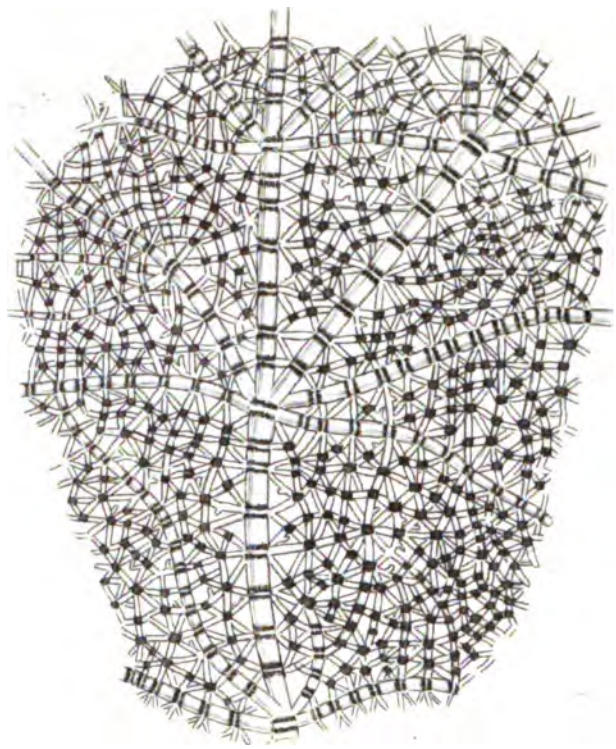
placebit) media abſorptione, ex pedicello antheræ minimo habita, ſpermatis, quod ſimul cum ſapâ per ſpicæ rachin ad ovarii ſinguli pedicellum deſcendat, admittere opus erit; imo id permultorum ſeminum abortio dijudicare vetat. Nec mirum tot abortiri ovula, cum planta habitet reptetque ſemper in locis ſubumbroſis et humidis, eumque ejus folia et iſtorum axillæ ſæpius aliquo rore conſpergantur, ac tandem cum perpaucæ antheræ ex ſuperioribus debito tempore aperiantur pollenque ejaculent: huic tamen natura proſpexit, ſpicis aſcendentibus copioſiſque, ovariis permultis, antheris ſummopere polliniferis et ad ſpicarum apices numeroſis; unde ſatis ſemper fertilium ad magnas in aggeribus noſtris ſegetes producendas ſeminum ſupereſt. Fateor tamen ſæpiſſime obſervaſſe antheras fere omnes, quæ in ſpicarum ſummitate proveniebant, eodem tempore, quo capſulæ aperiebantur propriores ſubtus ſitæ, aperiri, pollenque perfectum explodere: capſulis iſtis ſicut et eorum ſeminibus magnitudo erat naturalis, ſed ſemina oleo craſſo plena, (non autem ſolido vitello) integumento viridi teneroque, hilo ſimili, humido et ſurſum reverſo, cui aliqua interdum granula pollinis exploſa applicabantur; per pauca temporis momenta in capſula hianti manebant, nam citò ex ipſa ſurſum ac deorſum ad folia, aut vicinas ſpicas co-ſpecificas elaſtice deſiliebant, ubi nonnumquam in aliqua pollinis granula ejaculata incidebant. Itaque cum non veriſimile ſit iſta tot innumera ſemina omnia aborta, facile crederem nonnulla ſive ex propria ſive vicina alia planta co-ſpecifica granulis alicujus antheræ exploſæ jam fœcundata fuiſſe. Nonnulli fortaſſe hilum triangulare pro vero ſtigmate ſument, et fœcundationem ovulorum in iſta planta eodem, quo in piſcibus et quibuſdam aliis animalibus, modo fieri contendent, nempe per ſpermatis applicationem ovulis adultis, ſeu extra ovarium poſitis, maxime in eo innixi, quia ſemina nulla iſtius Lycopodii ſolida evadant, niſi poſteaquam ex capſulis elaſtice deſilierunt, et quia eorum

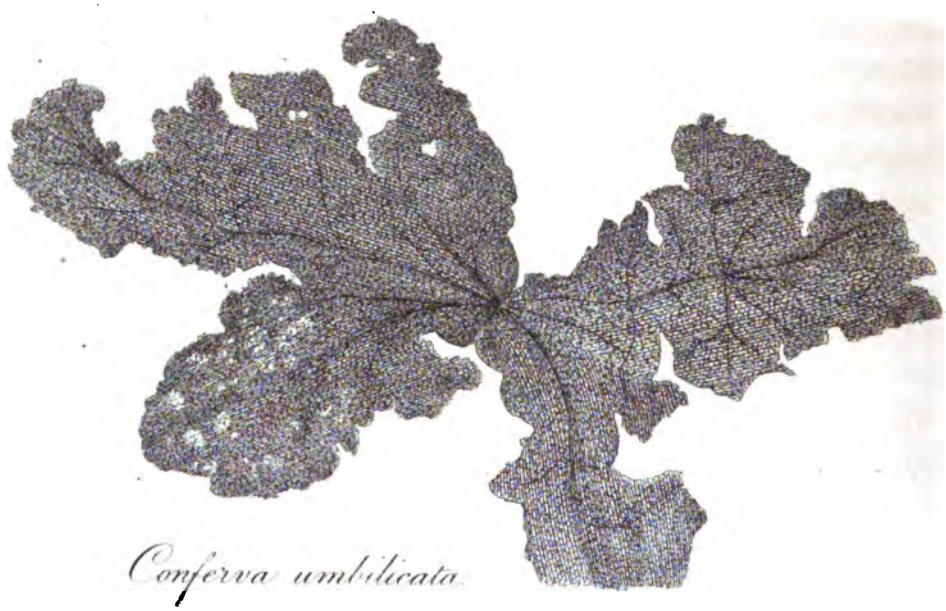
eorum integumentum hilo trifido tridenteoque in germinatione constanter aperiatur. Quamvis autem hæc opinio non improbabilis esse videatur, attamen cum ovula medio stigmate externo ovarii, quod descripsi, fœcundari possint, aliud admittere non opus est, præsertim quia in nullis seminibus usque adhuc in regno vegetabili notis fœcundatio in statu integumenti proprii adulto unquam observata fuit. Quidquid vero sit, illa quatuor corpuscula in capsulis conico-tricoccis contenta esse semina, et alia in capsulis reniformi-cordatis esse pollinis granula sat ex supradictis evidenter colligi posse censeo. Quapropter clariss. Gærtneri opinio*, qui pollinis corpuscula esse granula seminalia diversæ ab aliis ejusdem stirpis seminibus formæ credit, admodum a vero distat. Nam insuper, cui bono tot seminalia granula, si nunquam ex illis novellæ plantæ prodeunt? Ad aggeres Conimbricenses autumno et hyeme numerosas segetes Lycopodii nostri pluries observavi, nusquam tamen unum saltem ex sexcentis, quæ in germinationis statu avulsi, individuum inveni, quod ex corpusculis pro seminibus minoribus a clar. Gærtnero admissis (a me autem pro veri pollinis granulis) prodiret, imo omnia ex majoribus, sive veris seminibus, prout supra dixi de hujus nostræ stirpis germinatione agens, constantissime progerminare vidi, cum illa jam in humum putridam redacta essent, quoniam ut observavi, postquam vera officia mascula reddidere, corrugantur, marcescunt, contabescunt. Igitur probabile est Lycopodii species ad Monœciam alias, nonnullas vero ad Dicœciam referendas, quod autoptis decidendum relinquo; nostrum constantissime monoicum est.

* Agmen denique claudat Lycopodium, quod sæpe in eadem stirpe duplicis formæ semina; et præter hæc, foliaceas quoque gemmas, seminibus perperam annumeratas, producit. *J. Gærtner De Fruct. et Semin.* vol. 1. Intro. pag. xxv.

XVIII. *De-*

Linn Trans V. tab 7. p 169.





Conferva umbilicata

XVIII. *Deſcription of Conferva umbilicata, a new Plant, from New South Wales.*

By Lieutenant Colonel Thomas Velley, F. L. S.

Read July 2, 1799.

CONFERVA UMBILICATA.

Conferva fronde dilatata filamentis reticulatis, centro radicali.

TAB. VII.

THIS ſingular vegetable production was diſcovered by accident on the ſtem of a large *Fucus* from New South Wales*.—After having placed the latter in water for the ſpace of three or four days, a very fine filmy ſubſtance was obſerved floating cloſe to the ſtem, which immediately collapſed, and was ſcarcely diſcoverable when the *Fucus* was taken out of the veſſel. Upon a more minute inveſtigation, two or three ſeparate plants were found ſtrongly attached to the ſtem; all of which, from their extreme tenuity, were in ſome degree torn.

The frond of the largeſt might be between three and four inches diameter; it probably was of greater extent in its perfect ſtate, and ſeemed to favour a circular mode of growth. The baſe is ſomewhat central, and from it proceed two or three apparently

* Sent by Governor Hunter, who very laudably made a collection of plants for the purpoſe of promoting Natural Hiſtory.

membranaceous leaves, giving the frond the form of an umbilicated *Ulva*. Under the microſcope ſeveral cylindrical ſtems, not larger than a hair, were found to diverge ſuddenly in different directions, producing ſimilar ramifications in diſtinct whorls at ſmall diſtances, and carrying with them innumerable reticulated ramules combined together in all directions; ſome of which ſeemed in a ſmall degree to favour a circular tendency: the whole forming a moſt beautiful web of cylindrical filaments, far exceeding the fineſt lace, and ſetting at defiance the utmoſt art of the pencil. The interſtices do not retain any regular or prevailing form throughout, as they appear to do in the *Conferva reticulata*; but are united with each other in the manner above mentioned.

Two circumſtances are to be obſerved in the ſtructure of this plant. Firſt, the ramules, however varied in their direction, unite with the main ſtems at regular joints; while the ſeparations, or diaphragms, as they are generally called in the *Confervæ*, are evidently apparent at thoſe points of union. Secondly, between the interſtices ſmall ſubacute ſpinules frequently appear. Hence I was induced to conſider this vegetable production, however ſingular in its mode of growth, as a real *Conferva*. As the ramifications brought to my mind the veins of a leaf, I at firſt examined it under a notion of its being the ſkeleton of ſuch a body, after it had been diveſted of its cellular ſubſtance: but as this web ſo greatly ſurpaſſes in tenuity any of thoſe appearances, I conclude it could never have continued in ſo diſtinct and organized a ſtate, if its preſent form had been owing to an anatomical proceſs, which ſometimes accidentally takes place in decayed leaves.

The filaments, ſeparately viewed, were tranſparent, but contracted a degree of opacity at the joints. The whole plant, from the cloſeneſs of its texture, when taken in the maſs, has a ſombre green tint.

XIX. *Ob-*

XIX. *Observations on the British Species of Mentha.* By *James Edward Smith*, *M.D. F.R.S. P.L.S.*

Read March 5, 1799.

NO British genus of plants, except perhaps *Conferva*, has been hitherto less understood than that of *Mentha*; either with respect to its species, and the principles upon which their distinctions ought to be founded, or the synonyms of those species in the most recent, as well as the more ancient writers. Dillenius in his edition of Ray has truly observed, that England is peculiarly fertile in mints; but he confesses, notwithstanding all he had in that edition added to those of Ray, there still remained some described by Merrett, and others observed by Buddle and Rand, which he found himself obliged to leave for future enquiry.

In entering upon this difficult disquisition, it naturally divides itself, if I may be allowed a scholastic formality, into two parts: first, it will be found necessary to consider how preceding authors have treated it; and secondly, to enquire how it may be made more intelligible in future.

I. In treating of the genus of *Bromus* in our fourth volume, I found it not requisite to go farther back than the works of Ray. In the present instance Merrett's *Pinax*, and indeed a still more ancient work, the *Phytologia Britannica* of Dr. How, published in 1650, a work which escaped my recollection in writing the paper on *Bromus*, both require to be noticed.

Theſe publications were compoſed upon the plan which Ray afterwards followed. The authors enumerated every Britiſh plant, to the beſt of their knowledge, not indeed ſufficiently diſcriminating truly wild from exotic ſpecies, and arranged them alphabetically under one or more denominations, taken from any author that came in their way. Their works are therefore equally deficient in ſyſtem, and uniformity of nomenclature; for neither had been thought of in thoſe days, at leaſt in this country. Ray introduced a ſyſtematic arrangement, but was ſtill indiſcriminate in the books from which he took his ſynonyms, chooſing, from any quarter, what beſt expreſſed the plant he meant, or probably adopting ſuch as happened to be in the moſt general uſe. Hill and Hudſon firſt diſpoſed our native plants under the uniform nomenclature of one writer, Linnæus; the former indeed only as far as the genera were concerned, the latter with reſpect to both genera and ſpecies. How much is it to be regretted that, inſtead of beſtowing his talents in building a ſyſtem, which, however learned and ingenious, is now ſuperſeded by a more eaſy one, Ray did not undertake to define by words what he ſo well underſtood, the ſpecific differences of plants! We ſhould then have quoted him with certainty in every inſtance; whereas, if he ſhould now have chanced to miſtake a ſynonym, we are led into an error, unleſs we happen to know certainly the plant he muſt mean, and can judge for ourſelves, as well as he could, of the propriety of the ſynonym. Fortunately ſuch miſtakes in Ray are very rare, but they ſometimes occur. Hence it is neceſſary to obſerve that, though in quoting Ray, Merrett, How, or Dillenius for any plant, we are obliged to name it by the denomination of ſome prior writer, under which they have placed it in their books, we never anſwer for its being the plant intended by that writer. If we *believe* it to be ſo, we quote him expreſsly; if we certainly *know*

it,

it, we quote the Herbarium or ſpecimen on which our knowledge is founded. So in quoting Linnæus, we only anſwer for his own names, and by no means for any of his ſynonyms; for I am ſorry to ſay he is in that department more incorrect than moſt other writers, even in his moſt accurate and ingenious *Flora Lapponica*, and very much ſo in his laboured *Hortus Cliffortianus*. Dillenius has made many ſimilar miſtakes, and the works of Haller abound with them. How ill-adviſed therefore are thoſe who copy ſynonyms from any author without examining them! This is a truth I have often inculcated, but it cannot be too ſtrongly enforced. Let thoſe who think it unimportant purſue with me the hiſtory of the Britiſh Mints.

Dr. How enumerates 8 ſpecies of *Mentha* and *Menthaſtrum*, including *Calamintha aquatica* and *Pulegium*. One of theſe, "The great curled Mint of Germany," *Mentha criſpa Danica aut Germanica ſpinoſa*, has never been ſuppoſed to be Britiſh, and is left out even by Merrett. Another is the Cat Mint, *Nepeta Cataria* of Linnæus. The 6 remaining ſpecies I find no difficulty in aſcertaining, and ſhall quote in their proper places.

The *Pinax* of Merrett contains 11 ſuppoſed ſpecies of Mint, two of which belong to *Mentha Pulegium*, a third is *Nepeta Cataria*, another (*Calamintha aquatica*) is *Mentha arvenſis*. Five of the remaining ones are marked with an aſteriſk as being added by himſelf to the liſt of Britiſh plants, and of theſe the 4 laſt are as unintelligible to me as to Dillenius, nor do I know how they are to be aſcertained. I ſhall tranſcribe all Merrett ſays upon the ſubject.

"*Mentha* odorata flore cineritio. Five miles from Glouceſter, in the way to Hereford.

"*Mentha* Balſamita vel latifolia odorata. In the way betwixt Pemſey and Lewes in Suſſex. Diutiſſimè durat odor ejus ſuaviſſimus.

"*Mentha*

" *Mentha* incana fœtida.

" *Menthaſtrum* valde ramoſum flore violaceo rubro. At Dartford in Kent."

It is moſt probable that all theſe are referable to ſpecies we are acquainted with; but the above characters are too ſlight to determine them by, neither would I venture to decide upon them without ſeeing ſpecimens. It is not my purpoſe to gueſs at botanical enigmas, but to inveſtigate truth by the light of facts and authentic information.

The firſt edition of Ray's *Synopſis* (I paſs over his earlier catalogues) contains 8 real Mints including *Pulegium*, all from that excellent writer's own knowledge, and about which there is no kind of obſcurity. They will be quoted in proper order hereafter.

In the 2d edition three more are added, but with leſs accuracy. Theſe are M. *verticillata* n. 2, which appears to me a very doubtful ſpecies; M. *ſpicata* n. 5, the officinal Pepper-mint; and a verticillate mint n. 6, under which laſt two very diſtinct ſpecies are confounded, for in this inſtance Ray truſted to other people.

Before Dillenius publiſhed the 3d edition of Ray's *Synopſis*, botany was very aſſiduouſly and ſcientifically cultivated in England. The genus of *Mentha* particularly engaged the attention of Buddle, the three Dales and two Bobarts. Theſe induſtrious botaniſts collected a great number of ſpecies and varieties, and communicated to each other every thing they found, with remarks upon the properties and characters of each, and their conjectures about the ſynonyms of authors. Their original ſpecimens, preſerved in the Britiſh Muſeum, the Sherardian Herbarium at Oxford, or in my own collection, elucidated by ample manuſcript remarks, have been my guides in the ſtudy of this genus, which cannot be decyphered without them. The whole were ſubmitted to Dillenius, who made what uſe he choſe

choſe of them in his edition of the *Synopſis*, but by no means adopted or underſtood them all. What he has there inſerted, from theſe authorities or his own obſervation, is either marked with an aſteriſk or encloſed in crotchets. He has added two very bad figures, which have contributed to obſcure the ſubject. Sherard, to whom ſpecimens of all theſe plants were communicated, followed his favourite propenſity in accumulating ſynonyms for each, but not with accurate diſcrimination. Whether ſuch an undertaking may be too vaſt and difficult for any mind, or whether Sherard and Dillenius worked with too little caution, I know not; but, without detracting from their eminent knowledge and acuteneſs in other reſpects, I cannot but think it fortunate that the celebrated *Pinax* never appeared. Botany would then have been purſued by the indolent attention to ſynonyms inſtead of definitions, and would neither have been uſeful as an exerciſe for the mind, nor have led to the actual knowledge of Nature. As Buddle and Samuel Dale ſtudied plants with a view to their medical qualities, it is not wonderful that they ſhould have paid great attention to the various odours of Mints; upon which, added to the ſhape of the leaves and the different degrees of hairineſs, their ideas of ſpecies were founded. All theſe however are variable circumſtances, eſpecially the ſmell. When Linnæus took up the ſubject he likewiſe depended on the form of the leaves, taking a farther character from the ſtamina being longer or ſhorter than the corolla, and in this Mr. Hudſon and Mr. Sole have followed him. Let us inveſtigate theſe methods of diſcrimination.

Almoſt every ſpecies of Mint indeed has in its original wild ſtate a peculiar ſmell of its own, by which alone the *Mentha rotundifolia*, for inſtance, is at once known from every variety of the *ſylveſtris*; and the M. *arvenſis*, by its ſmelling like blue mouldy cheeſe, is diſtinguiſhed from other whorled mints. But many mints are capable

of

of acquiring an entirely new ſmell, either by accidental variation of ſoil, a dry ſituation, or ſome change in their conſtitution which we cannot underſtand. Thus the ſmell of Sweet Baſil, *Ocymum*, is acquired by ſome, that of Orange by others, and one or two acquire a peculiarly ſweet ſmell, which belongs alſo to a ſweet variety of the Garden Thyme, *Thymus vulgaris*, called in Norfolk, where it is very common, Frankincenſe Thyme. The ſmell and taſte of Pepper Mint, which ſeem natural to our well-known ſpecies ſo named, are ſhared in common with it by ſome others, even wild in England; and the *Mentha piperita* uſed in Sweden, and deſcribed by Linnæus and Bergius, is certainly a different ſpecies from ours. Indeed I am told by thoſe who cultivate our Pepper-mint for medical purpoſes, that, to keep up its quality, the roots muſt be tranſplanted every three years; otherwiſe it degenerates into the flavour of Spear-mint, from which nevertheleſs it is ſpecifically different.

The ſhape of the leaves, though in ſome inſtances tolerably conſtant, in others is found very variable both as to length and breadth. This is particularly the caſe in the ſpiked Mints. The degree of hairineſs of the leaves, and in general of the whole plant, is extremely uncertain. I need ſcarcely ſay, colour is not at all to be depended on. Many mints expoſed to much air and ſun become altogether purple. The length of the ſtamina is alſo a variable circumſtance. As all theſe plants have creeping roots, the ſeeds are rarely perfected, and even the ſtamina frequently prove abortive. In this caſe they are commonly ſhorter than the corolla.

The inflorescence in this and every genus has been conſidered by all authors as affording indubitable marks of ſpecific diſtinction. The mints have been divided into ſpiked, capitate and verticillate. Some very ſtriking circumſtances have led me to doubt whether even theſe diſtinctions are well founded. I am very confident the ſame

ſpecies is found capitate and verticillate in the ſame meadow, though, I acknowledge, no intermediate varieties, by which we could trace their connexion, are in general obſervable; but I have ſeen one or two ſuch ſpecimens. I have ventured to mention this novel opinion in the *Engliſh Botany*, p. 448, and have converſed with ſeveral accurate botaniſts upon it. Moſt of them are ſo averſe to it, that I cannot venture abſolutely to inſiſt upon it. The following arrangement of Britiſh Mints will therefore be founded on nearly the eſtabliſhed principles of inflorescence, but I ſhall mention wherever thoſe principles appear to me to divide a real ſpecies.

II. Having found ſo much difficulty in determining the ſpecies of *Mentha* by all the modes of diſcrimination hitherto contrived, I was ſoon convinced of the neceſſity of diſcovering ſome other principle, or of leaving the genus altogether a chaos as I found it. The experienced botaniſt well knows how peculiarly difficult it is to meet with certain diſcriminative marks between genera in very natural orders; happily it is not always equally difficult in very natural genera to trace out ſpecific characters. On the contrary, Nature generally makes ſome one peculiar part, either in the herbage or flower, ſo various in the different ſpecies, and ſo conſtant in the ſame, as to afford, to a careful inveſtigator of the ſubject, a very certain clue. Thus, the various hairineſs of the ſtamina in *Orobanche*, the ribs of the calyx in *Arenaria*, the form of the ſtigma in *Crocus*, the abſence or preſence of a nectarium in *Cuſcuta*, the ſhape of the capſule in *Fumaria* and ſome ſpecies of *Juncus*, and its ſituation in different *Saxifragæ*, the various numbers of ſtamina and ſtyles in *Polygonum*, *Phytolacca*, *Ceraſtium*, and ſeveral other genera; all theſe circumſtances, ſome of which in other inſtances afford generic diſtinctions, in the above natural genera conſtitute the beſt and moſt

important ſpecific ones. If I am not too ſanguine, I have met with as ſatisfactory a mode of determining ſpecies in *Mentha* by the calyx and flower-ſtalks, particularly with regard to the pubeſcence of thoſe parts and its various direction. This is moſt peculiarly uſeful in the verticillate Mints, where it is moſt wanted. In one caſe we find the flower-ſtalk and baſe of the calyx invariably ſmooth and naked, the upper part and teeth only of the latter being rough with hairs pointing upward; in another the calyx is all over clothed with projecting horizontal hairs; in a third it is covered with hairs which point upward, and the flower-ſtalk with hairs that point downward. Theſe circumſtances appear to me invariable. I have examined innumerable dried as well as living ſpecimens, I have watched their growth in different ſoils, always with this particular object in view, and have found no reaſon to alter my opinion. I do not ſay the hairineſs of theſe parts never varies in degree, but even in this reſpect it varies much leſs than that of any other part of the plant, except in M. *viridis*, which is a ſpiked ſpecies, and it never varies in direction. The utility of this ſource of diſcrimination will beſt appear when we come to inveſtigate the verticillate ſpecies. I ſhall therefore ſay no more upon it at preſent, but proceed to a practical illuſtration of the whole.

As this genus is ſo perfectly natural that no one can be more ſo, it will be beſt, after mentioning its eſſential generic character, to give an account of thoſe particulars in which all the ſpecies agree. This will prevent uſeleſs repetitions in the ſeparate deſcriptions of each.

GENERIC

GENERIC CHARACTER.

MENTHA. *Linn. Gen. Pl.* 291. *Juſſ. Gen.* 113.

DIDYNAMIA *Gymnoſpermia.*

Calyx quinquefidus. *Corolla* ſubæqualis, quadrifida; laciniâ latiore emarginatâ. *Stamina* erecta, diſtantia.

Character Naturalis.

Radix repens, perennis. *Caules* ramoſi, quadranguli, folioſi. *Folia* oppoſita. *Flores* verticillati, pedicellati, verticillis ſimplicibus, capitatis, vel ſpicatis. *Calyx* cylindricus, monophyllus, ſtriatus, quinquedentatus, ferè regularis. *Corolla* infundibuliformis, calyce paulò longior, purpuraſcens. *Stamina* tubo inſerta. *Stigma* bifidum, acutum, divaricatum. *Semina* quatuor, parva, ſæpiùs abortiva.

Herba aromatica, reſinoſo-punctata, plerumque magis vel minùs pubeſcens.

SPECIES.

* *Spicatæ vel capitatæ.*

1. MENTHA *ſylveſtris.*

Horſe Mint.

M. ſpicis villoſis ſubcontinuis, foliis acutis dentato-ſerratis ſubtùs præcipuè tomentoſis, bracteis ſubulatis.

α, foliis lanceolatis.

Mentha ſylveſtris. *Linn. Sp. Pl.* 804. *Hudſ.* 250 α. *Hull.* 125.
M. ſpicata β, longifolia. *Linn. Sp. Pl. ed.* 1. 576.
M. ſpicata α, longifolia. *Gouàn. Hort.* 279.
M. longifolia. *Hudſ. ed.* 1. 221. *Herb. Roſe.*
M. villoſa prima. *Sole Menth.* 3. *t.* 1.
M. n. 227. *Hall. Hiſt. v.* 1. 99.
M. ſpicis ſolitariis interruptis, foliis lanceolatis ſerratis ſeſſilibus. *Linn. Hort. Cliff.* 306. *n.* 1. *Herb. Cliff.*
M. ſylveſtris, longiore folio. *Bauh. Pin.* 227.
Menthaſtrum. *Dod. Pempt.* 96. *Lob. Ic.* 509. *Ger. em.* 684. *How. Phyt.* 74. *Merr. Pin.* 77.
M. ſpicatum, folio longiore candicante. *Bauh. Hiſt. v.* 3. *p.* 2. 221. *Raii Syn. ed.* 1. 79. *ed.* 2. 124. *ed.* 3. 234.

β, foliis ovatis.

Mentha ſylveſtris. *Fl. Dan. t.* 484.
M. villoſa ſecunda. *Sole Menth.* 5. *t.* 2.
M. villoſa. *Hull.* 126.
Menthaſtrum. *Riv. Monop. Irr. t.* 51. *f.* 1.

γ, Mentha candicans, foliis ſpicis et odore vulgari ſativæ ſimilis. *Doody in Raii Syn. ed.* 2. 341. *Herb. Bobart.*

δ, foliis ellipticis latis.

Mentha rotundifolia. *Sole Menth.* 9. *t.* 4.
M. alopecuroides. *Hull.* 126.
M. rotundifolia ſpicata altera. *Linn. in Herb. Cliff. at vix Bauh. Pin.* 227.

M. ſyl-

M. ſylveſtris rotundiore folio. *Bauh. Pin.* 227, *ex ſide Herb. Bauh.* Haller.

M. hortenſis ſecunda. *Fuchſ. Hiſt.* 289.

Menthaſtrum ſylveſtre foliis latis. *Hort. Eyſt. Æſt. ord.* 7. *t.* 3. *f.* 2.

In ruderatis et paludoſis. Fl. Auguſto.

α and β are found in various parts of England.—γ plentiful in Kent. *Rand. Buddle in Bobart's Herbarium.*—δ in Kent and Eſſex, but rare. *Sole.* At Thorpe near Norwich, and in other parts of Norfolk.

Caules 2—4-pedales, erecti, villoſi, pilis deflexis. *Folia* ſeſſilia, ſupra incana, ſubtùs villoſa, dentato-ſerrata; in α lanceolato-oblonga; in β ovata; in γ ovata, minora, magiſque tomentoſa; in δ elliptica, latiſſima, inciſo-ſerrata. *Spicæ* terminales, paniculatæ, acutiuſculæ, villoſæ, denſæ, multifloræ, verticillis inferioribus remotiuſculis. *Bracteæ* ſubulatæ, villoſæ, floribus duplò longiores; inferiores latiores. Pili *pedicellorum* arctè deflexi. *Calyx* parvus, undique hirtus, dentibus ſetaceis, tubo longioribus. *Corolla* calyce duplò longior, incarnato-purpurea, extùs hirſuta. *Stamina* plerumque incluſa.

The firſt and ſecond varieties of this ſpecies are well known by the name of Horſe-Mint, and are not very unfrequently to be met with, eſpecially the ſecond, in moiſt or ſhady places, on the banks of rivers, or in waſte ground, orchards, farm-yards, &c. They differ a little in the ſhape of their leaves, but in no other reſpect; and run ſo much into one another, that it is by no means eaſy to ſettle the ſynonyms of each. Even Mr. Sole, ſo ſtudious of differences in the ſpecies of *Mentha*, and ſo acute in diſcerning them, eſteems

eſteems theſe to be mere varieties of each other. They have a ſtrong ſmell peculiar to this ſpecies.

The third variety I have ſeen only in Bobart's Herbarium at Oxford, ſent by Buddle, with a ticket in his own hand-writing as follows.

" M. candicans foliis ſpicis et odore vulgari ſativæ ſimilis, Doody " in App. R. Syn. 341. I take this to be only a ſweet-ſcented " variety of the Menthaſtrum ſpicatum, folio longiore candicante, " J. B. 3. 221. Obſerved by Mr. Rand plentifully in Kent, where " they call it the Rough Spear-mint. Of this kind I take to be the " Menthaſtrum niveum Anglicum, Park. 32."

The ſpecimen appears to be a variety of M. *ſylveſtris* with ſmaller and ſhorter leaves, ſcarcely exceeding an inch in length. The ſpikes are numerous, denſe, obtuſe, downy, looking ſomewhat like thoſe of the true M. *rotundifolia*, but I am ſatisfied it is not that ſpecies. In Buddle's own herbarium, in the Britiſh Muſeum, it is remarkable that the ſpecimen to which this quotation of Doody is annexed, is almoſt exactly like that marked Menthaſtrum ſpicatum folio longiore candicante, J. B. my firſt variety of *ſylveſtris*, and ſtill more cloſely perhaps agrees with the ſpecimen in Mr. Roſe's collection named under Mr. Hudſon's authority *longifolia* of his firſt edition.

In the Bankſian herbarium is a ſpecimen from Switzerland of Haller's *Mentha n.* 228, which has a very ſweet baſil-like ſmell. It appears to be a ſmall downy variety of M. *ſylveſtris*. I have ſeen nothing ſimilar to it in England.

My fourth variety is very often taken for the M. *rotundifolia*, and Mr. Sole has ſo denominated it. It differs from the preceding varieties principally in the form of its leaves, which are elliptical, obtuſe, and very broad. Culture makes no alteration in their ſhape. In other reſpects, after the examination of numerous wild and culti-

vated ſpecimens, I cannot find the ſhadow of a ſpecific character, nor even a difference in taſte, ſmell, or colour.

2. MENTHA *rotundifolia.*

Round-leaved Mint.

M. ſpicis ſubhirſutis interruptis, foliis ellipticis obtuſis rugoſis crenatis ſubtùs villoſis, bracteis lanceolatis.

Mentha rotundifolia. *Linn. Sp. Pl.* 805. *Hudſ.* 251. *With.* 522. *Engl. Bot. t.* 446. *Hull.* 126.

M. criſpa. *Linn. Sp. Pl. ed.* 1. 576.

M. ſylveſtris. *Sole Menth.* 7. *t.* 3.

M. n. 226. *Hall. Hiſt. v.* 1. 99.

Menthaſtrum anglicum. *Riv. Monop. Irr. t.* 51. *f.* 2.

M. folio rugoſo rotundiore, ſpontaneum, flore ſpicato, odore gravi. *Bauh. Hiſt. v.* 3. *p.* 2. 219. *Raii Syn. ed.* 1. 79. *ed.* 2. 124. *ed.* 3. 234. *Herb. Buddle.*

Mentaſtrum. *Tabern. Kreuterb.* 729.

β. Menthaſtrum niveum Anglicum. *Lob. Ic.* 510. *Ger. em.* 684.

M. ſpicatum folio criſpo rotundiore colore partim albo, partim cinereo vel virente. *Bauh. Hiſt. v.* 3. *p.* 2. 219.

M. cinereum vel niveum Anglicum, variegatis foliis. *Hort. Eyſt. Æſt. ord.* 7. *t.* 3. *f.* 2; too large and luxuriant.

In ruderatis humidis, et paludoſis. Fl. Auguſto, Septembri.

By the river ſide at Lydbrook near Roſs, Herefordſhire, alſo in Eſſex. *Ray.* Near Hally, Kent, plentifully. *Doody.* In Hornſey and Harefield churchyards. *Blackſtone.* Near Saltburn, Yorkſhire,

ſhire, by the ſea, in a dry ſandy place; Mr. Robſon. *With.* On the edge of an old moat at Shingham, Norfolk. *Rev. Mr. Forby.* β is common in gardens.

Caules 2—3-pedales, erecti, piloſi ſeu villoſi, pilis ſubdeflexis. *Folia* ſeſſilia, elliptico-ſubrotunda, rugoſa, ſupra ſubpiloſa, ſubtùs villoſa, acutè crenata; inferiora elliptico-oblonga; ſuperiora minora, inciſo-ſerrata. *Spicæ* paniculatæ, obtuſiuſculæ, hirſutæ, interruptæ, verticillis omnibus ferè remotiuſculis. *Bracteæ* lanceolatæ, hirſutæ, floribus duplò longiores, ſæpiùs deflexæ; inferiores ovatæ. Pili *pedicellorum* deflexi. *Calyx* parvus, campanulatus, undique hirtus, dentibus lanceolatis, longitudine tubi. *Corolla* ferè præcedentis. *Stamina* exſerta. *Odor* totius herbæ acris et ingratus.

This ſpecies is readily diſtinguiſhed by its ſmell from every variety of M. *ſylveſtris*, nor has it been obſerved to alter in that or any other reſpect, except the variegation of its leaves, which in the garden variety are ſtrikingly blotched and ſtriped with white; ſometimes they aſſume that colour entirely. It is always a much leſs hoary plant than M. *ſylveſtris*; the leaves are conſtantly more or leſs elliptical, and frequently almoſt round. The more interrupted ſpikes, broad bracteæ, ſhorter teeth of the calyx, and long projecting ſtamina, which laſt appear to be invariable, ſerve alſo to diſtinguiſh M. *rotundifolia.* Nevertheleſs it is not eaſy to give a ſpecific character which will always enable a ſtudent to know it from the former ſpecies, without adverting to its very peculiar acrid and diſagreeable ſmell; accompanied by a degree of viſcidity when touched, firſt pointed out to me by the Rev. Mr. Forby.

Mr. Sole eſteems this one of the moſt valuable Mints for medical purpoſes, and has found it very efficacious in many caſes of nervous debility.

3. MENTHA *viridis.*

Spear Mint.

M. ſpicis interruptis, foliis ſeſſilibus lanceolatis acutis nudis, bracteis ſetaceis dentibuſque calycinis ſubhirſutis.

Mentha viridis. *Linn. Sp. Pl.* 804. *Hudſ.* 250. *With.* 521. *Hull.* 126. *Woodv. Med. Bot. t.* 170. *Sole Menth.* 11. *t.* 5.

M. ſpicata α, viridis. *Linn. Sp. Pl. ed.* 1. 576.

M. n. 229. *Hall. Hiſt. v.* 1. 100.

Mentha. *Camer. Epit.* 477.

M. Romana officinarum, ſive præſtantior anguſtifolia. *Lob. Ic.* 507. *Herb. Buddle.*

M. ſativa, *herba. Pharmac. Lond.*

β, M. anguſtifolia ſpicata. *How. Phyt.* 74. *Raii Syn. ed.* 1. 79.

M. anguſtifolia ſpicata glabra, folio rugoſiore, odore graviore. *Raii Syn. ed.* 2. 123. *ed.* 3. 233. *Herb. Sherard.*

M. ſpicata noſtras, Cardiacæ ſativæ formâ et odore æmula, folio rugoſiore. *Pluk. Mant.* 129.

Mentha. *Camer. Epit.* 477. benè.

γ, M. ſpicata anguſtifolia glabra, ſpicâ latiore. *Dill. in Raii Syn.* 233. *Dale in Herb. Sherard.*

M. ſylveſtris, longioribus, nigrioribus, et minùs incanis foliis. *Bauh. Pin.* 227. *Sherard.*

δ, M. ſpicata glabra latiore folio. *Dill. in Raii Syn.* 234. *Dale in Herb. Sherard.*

In paluſtribus. Fl. Auguſto.

Near Exmouth, Devonſhire, and on the banks of the Thames. *Hudſon.* On a common between Glaſtenbury and Wells, alſo in a meadow 4 miles from Bath, and various places by the ſide of the Avon between Bath and Kelſton. *Mr. Sole.* β found by Mr. Dale by the river ſide at Bocking Eſſex. *Ray, and Herb. Sherard.* On the river Medway near Maidſtone, Kent. *Plukenet.* At Babergh near Norwich. *Mr. Pitchford.* γ in a meadow at Bocking, Eſſex. *Dillenius, and Dale in Herb. Sherard.* δ in a meadow by Manwood bridge, on the right hand of the road from Merſey-iſland to Colcheſter. *Dillenius, and Dale in Herb. Sherard.*

Caules 2—3-pedales, erecti, glabri, ramoſi. *Folia* ſeſſilia, lanceolata, acuta, ſerrata, glabra, quandoque ſubtùs ſubhirſuta; in β, γ et δ latiora et breviora, magiſque aliquantulùm rugoſa. *Spicæ* paniculatæ, elongatæ, acutæ, verticillis ferè omnibus remotiuſculis. *Bracteæ* ſetaceæ, floribus duplò longiores, magis vel minùs ciliatæ; inferiores ſubindè lanceolatæ. *Pedicelli* omninò glabri. *Calyx* ſulcatus, in α glaber, in β, γ et δ dentibus ciliatis, pilis longitudine variis. *Corolla* gracilis, purpurea, glabra. *Stamina* longitudine varia.

The common Spear-mint of the gardens was not reckoned among our wild plants by either Ray or Dillenius. Mr. Hudſon however admits it, and the authority of Mr. Sole confirms his opinion. It is diſtinguiſhed from the other ſpiked Mints by its lanceolate, pointed, and perfectly ſmooth leaves. Its flower-ſtalks and tube of the calyx are alſo quite ſmooth, though the teeth of the latter are not always free from hairineſs; and the bracteæ are generally ciliated. This is our firſt variety, the real *Mentha viridis* of the Linnæan herbarium and of all authors.

Our 2d 3d and 4th varieties have been enveloped in great obſcurity, probably

probably from Ray's having ſo ſtrongly inſiſted upon the firſt of them being diſtinct from the garden Spear-mint. Hence Hudſon was induced to ſeparate them from that, and, on account of their hairy ſpikes perhaps, to refer them to his *villoſa*, our *ſylveſtris*. I am convinced the conſtant nakedneſs of their flower-ſtalks and baſe of the calyx, how hairy ſoever the teeth may be, is a deciſive mark of their having no affinity to *ſylveſtris* or *rotundifolia*, but, on the contrary, evinces their belonging to the *viridis*, with which their general habit and ſtructure altogether agree. They only differ from it in having a ſtronger and leſs grateful ſmell; their leaves are more rugoſe, rather broader, and generally ſhorter; their bracteæ perhaps are not quite ſo ſetaceous as in the *viridis*, but all theſe circumſtances vary. With reſpect to their differences from each other, nothing can be more ſlight; nor ſhould I have believed that any botaniſt would have made them different ſpecies, had I not examined the authentic ſpecimens of Dale in Buddle's and Sherard's collections. Of theſe my variety γ has the moſt hairy ſpike, the teeth of the calyx and the bracteæ being fringed with long white hairs. The leaves are alſo a little hairy beneath. It is not eaſy to underſtand why Dillenius defines this "*ſpica latiore.*" δ has ſhorter and rather broader leaves, and the hairs on the bracteæ and calyx are ſhorter. β, the moſt common variety, has broader leaves, with a leſs hairy ſpike.

I cannot conclude this account of M. *viridis* without noticing one more variety of that ſpecies, though it has not yet been obſerved wild in Great Britain. This differs from the foregoing chiefly in having very broad ovate leaves, deeply and ſharply ſerrated, more or leſs criſped or curled about the edges. The bracteæ and calyx-teeth are fringed with ſhort hairs, and the former are broader than is uſual in the other varieties, ſo that they might be termed linear-lanceolate. This is the——

Mentha floribus ſpicatis, foliis cordatis dentatis undulatis ſeſſilibus. *Linn. Hort. Cliff.* 306. *n.* 3. *Herb. Cliff.* but the ſynonyms there quoted belong to M. *criſpa* of Linnæus, a moſt diſtinct ſpecies.

Another ſpecimen with ſhorter and rounder leaves is in the Cliffortian herbarium marked "Mentha criſpa verticillata *C. Bauh. Pin.*" which certainly it cannot be. This ſpecimen however is not alluded to in the *Hortus Cliffortianus.*

I have in my poſſeſſion two ſpecimens of this plant from Miller's herbarium, communicated to him by Houſton, who gathered them in the Leyden garden in 1728, and has affixed to them a ticket, in his own hand-writing, containing four ſynonyms, every one of which, I verily believe, belongs to a different ſpecies, and not one of them to the plant in queſtion! With all theſe ſynonyms it is however diſtinguiſhed in Boerhaave's *Hort. Lugd. Bat.* 185, *n.* 3.* and a fifth is there ſuperadded which belongs to ſtill another ſpecies different from all the reſt. Such extreme confuſion is rare, even in the hiſtory of *Menthæ!* It happens that one of theſe ſynonyms, *M. rotundifolia rubra, Aurantii odore, Moriſ. v.* 3. 369. belongs to Mr. Sole's *M. odorata*, commonly called in our gardens Orange Mint; and the moſt curious circumſtance of all is, that Miller, in the 8th edition of his Dictionary, n. 9, meaning to deſcribe this Orange Mint by the name of *M. rubra*, and happening to have before him the two ſpecimens now in my poſſeſſion, with this erroneous ſynonym of Moriſon annexed, fabricated from them his character and deſcription; conſequently what he has ſaid by no means accords with the plant implied by his latin as well as engliſh name, and which I have no doubt was what he had in his garden.

* Theſe ſynonyms were copied by Houſton from Boerhaave's work, as appears by an error of the preſs which he has retained, in citing John Bauhin, 318 inſtead of 218.

4. MENTHA.

4. MENTHA *piperita*.

Pepper Mint.

M. ſpicis obtuſis infernè interruptis, foliis petiolatis ſubovatis glabriuſculis, calyce baſi glaberrimo.

α, foliis ovato-lanceolatis.

Mentha piperita. *Hudſ.* 251. *With.* 523, *var.* 2. *Woodv. Med. Bot. t.* 169.
M. piperita officinalis. *Sole Menth.* 15. *t.* 7.
M. piperitis, *herba*. *Pharmac. Lond.*
M. officinalis. *Hull.* 127.
M. aquatica nigricans, fervido ſapore. *Herb. Buddle.*
Eales' Pepper-mint. *Pet. H. Brit. t.* 31. *f.* 10.

β, ſpicis abbreviatis, foliis ovatis.

Mentha piperita. *Hull.* 127.
M. piperita vulgaris. *Sole Menth.* 19. *t.* 8.
M. ſpicis brevioribus et habitioribus, foliis Menthæ fuſcæ, ſapore fervido Piperis. *Raii Syn. ed.* 2. 124. *ed.* 3. 234. *t.* 10. *f.* 2.
M. fervida nigricans, breviore folio et ſpicâ. *Herb. Sherard.*
M. aquatica ſive Siſymbrium. *Bauh. Hiſt. v.* 3. *p.* 2. 223?

γ, foliis cordato-ovatis.

M. piperita ſylveſtris. *Sole Menth.* 53. *t.* 24.
M. hircina. *Hull.* 127.

In aquoſis. Fl. Auguſto, Septembri.

α in Hertfordſhire. *Dr. Eales.* In a ſwampy place on Lanſdown, near Bath, called the Wells; alſo by the ſide of the Avon in

Newton-mead. *Mr. Sole.* In a rivulet in Bonſall dale near Matlock, 1790. β in Eſſex. *Dale.* By Wandſor (Wandſworth) river. *Herb. Sherard.* In various watery places about Bath, and between Wells and Glaſtenbury; alſo in Chiltern-bottom, Wilts. *Mr. Sole.* γ in a ſwampy place at Lyncomb Spa, and various other wet places about Bath. *Mr. Sole.* In a little peninſula on the ſouth-weſt ſide of Saham meer near Watton, Norfolk, obſerved by Mr. Crowe and myſelf in 1797.

Caules erectiuſculi, 2—3-pedales, (in γ 4-pedales,) ramoſi, purpuraſcentes, ſubhirſuti, pilis recurvis. *Folia* omnia petiolata, ovata, acutiuſcula, ſerrata, atro-viridia, ſupra glabriuſcula, ſubtùs pallidiora magiſque hirſuta, venis albidis vel purpuraſcentibus; in α anguſtiora et ferè lanceolata; in β breviora et ſubelliptica; in γ latiora, cordato-ovata, ſæpiùs glabra. *Spicæ* terminales, ſolitariæ, obtuſiuſculæ, infernè interruptæ, verticillo infimo (in α et γ) remotiſſimo, pedunculato; in β abbreviatæ, obtuſiores, et ferè capitatæ. *Bracteæ* lanceolatæ, ciliatæ. *Pedicelli* vel omninò glabri, vel ſupernè hirſuti, pilis raris recurvis. *Calyx* ſulcatus, gracilis, glanduloſo-punctatus, baſi omninò denudatus et glaberrimus, dentibus atro-purpureis, ciliatis, quandoque (in γ) apicem verſus undique hirſutus, pilis adſcendentibus. *Corolla* purpuraſcens. *Stamina* incluſa. *Odor* pungens, ſubcamphoratus; *ſapor* aromaticus, fervidus, amaricans; in γ viroſus et ingratus.

Britiſh botaniſts have long been in great perplexity concerning the ſynonyms of the common garden pepper-mint, ſo valuable for its medicinal properties. No one had however ſuſpected that it was not the *Mentha piperita* of Linnæus, till his herbarium arrived amongſt us. His original ſpecimen there preſerved is indeed the pepper-mint of the north

north of Europe, well deſcribed by Bergius in his Materia Medica, but quite diſtinct from ours, from which it may at once be known by its very hairy flower-ſtalks and calyx. It is merely a variety of the *M. hirſuta* of Linnæus with the flavour of pepper-mint, of which I ſhall preſently mention another inſtance; and this being the caſe, I beg leave to retain the name *piperita* for the original Pepper-mint of Ray. Of this there are two varieties, my α and β, diſtinguiſhed as ſpecies by Mr. Sole, but by cultivating the living ſpecimens with which he has favoured me, and obſerving various others in a dried ſtate, I am perſuaded they cannot be ſpecifically diſtinct. The old authors ſuppoſed them to be one and the ſame, as we learn from the collections of Buddle and Sherard; by which alſo we aſcertain with preciſion the ſynonyms of Ray and Dillenius. A Dr. Eales appears to have been the diſcoverer of this valuable plant, and he ſeems to have firſt gathered the long-ſpiked narrow-leaved kind, ſuppoſed to be of the beſt quality. A ticket is annexed in Sherard's herbarium to the capitate variety, which aſſerts that "Ray judged this to be the *M. aquatica ſive Siſymbrium* of John Bauhin, and compared its ſcent to Penny-royal." I think the writer of this ticket miſtook the plant Ray meant, which is the common *hirſuta* of Linnæus; but nevertheleſs it ſeems very probable, from John Bauhin's figure and deſcription, that our capitate pepper-mint may be what the latter intended. He ſays indeed nothing about its calyx, but he deſcribes and figures the *M. hirſuta* in the next chapter, expreſsly mentioning the denſe hairineſs of the calyx in that ſpecies.

No writer before Mr. Sole ſeems to have noticed my third variety, γ. It is a larger plant in every reſpect than the others, with broad almoſt heart-ſhaped leaves, and long thick ſpikes. Its flavour is that of the garden pepper-mint, but much leſs agreeable. It varies in degree of hairineſs; even the upper part of the tube of the calyx is occaſionally

caſionally hairy, though never the lower part; the upper ſide of the leaves in general is quite ſmooth and rather ſhining. I have not hitherto obſerved it to alter much by culture, even in a dry ſoil, but conſidering the changes to which M. *piperita* is certainly liable, I can diſcover nothing on which to found a ſpecific difference between them.

5. MENTHA *odorata.*

Bergamot Mint.

M. ſpicis capitatis, foliis petiolatis cordatis utrinque nudis, calyce undique glaberrimo.

Mentha odorata. *Sole Mentb.* 21. *t.* 9.

M. rubra. *Mill. Dict. deſcr. erroneâ.*

M. rotundifolia rubra, aurantii odore, (rotundifolia ſpicata, altera C. B.) *Moriſ. v.* 3. 369. *ſect.* 11. *t.* 6. *f.* 3, *glabra.*

In aquoſis rariùs. Fl. Julio, Auguſto.

Very common by the ſides of rivers and brooks in Cheſhire, eſpecially about Aſton houſe; Mrs. Walmſley: alſo in a ſmall brook or ditch near Capel-Carey, between Llanrooſt and Llanberrys, North Wales. *Mr. Sole.*

Herba tota glaberrima, rubicunda. *Caules* bipedales, erecti, ramoſiſſimi. *Folia* petiolata, latè cordata, obtuſiuſcula, ſerrata. *Spicæ* terminales, breviſſimæ, capitatæ, obtuſæ, denſæ, verticillo infimo remoto, axillari, ſubpedunculato. *Bracteæ* ſetaceæ, omninò glabræ. *Pedicelli* teretes, glaberrimi, atro-purpurei. *Calyx* gracilis, ſulcatus, glanduloſo punctatus, atro-purpureus, tubo dentibuſque omninò glaberrimis. *Stamina* incluſa. *Odor* aurantiacus, ferè Monardæ didymæ.

This

This appears to me a very diſtinct ſpecies, conſtant in the broad heart-ſhaped form of its leaves, orange-like ſcent, and invariable ſmoothneſs of the whole plant, even the teeth of the calyx. In the form of that part it moſt nearly approaches to *M. piperita.* Mr. Sole conſiders it as conſtituting one ſpecies with Dillenius's Mentha Siſymbrium dicta hirſuta, glomerulis ac foliis minoribus ac rotundioribus, *Raii Syn. ed.* 3. 233. *t.* 10. *f.* 1; and Moriſon ſeems to have been of a ſimilar opinion, from the hairy figure he has annexed to his proper ſmooth one. I have not obſerved a ſpecimen of Dillenius's plant in any herbarium; but his deſcription, notwithſtanding the orange ſcent, ſeems to expreſs a variety of M. *hirſuta*, to which his figure unqueſtionably belongs; and from the place of growth it ſhould ſeem likely that Merrett's M. balſamita vel latifolia odorata might be the ſame with that; yet the epithet *latifolia* ſeems rather more proper for our plant than that of Dillenius. However this may be, I am certain *M. odorata* can never be a variety of *hirſuta*; neither is it the *aquatica* of Linnæus, though ſome part of his deſcription agrees with it. His expreſſion "planta non hirta" ſeems peculiarly expreſſive of it, but the ſtamina being conſtantly ſhorter than the corolla has always been an objection. What his *aquatica* really is will be explained hereafter.

6. MENTHA *hirſuta.*

Hairy Water Mint.

M. ſpicis capitatis, foliis petiolatis ovatis, calyce undique hirſuto, pedicellis retrorſum hiſpidis.

α, Mentha hirſuta. *Linn. Mant.* 81. *With.* 522. *Hudſ. ed.* 1. 223. *Engl. Bot. t.* 447. *Hull.* 127.

M. aquatica. *Hudſ.* 252, α et β.

M. aquatica major. *Sole Mentb.* 25. *t.* XI; & minor, *ibid.* 23. *t.* 10.

M. aquatica ſeu Siſymbrium. *How. Phyt.* 74. *Merr. Pin.* 76. *Raii Syn. ed.* 1. 78. *ed.* 2. 123. *ed.* 3. 233. *Ger. em.* 684. *Herb. Buddle.*

M. floribus capitatis, foliis ovatis ſerratis petiolatis. *Linn. Hort. Cliff.* 306. *n.* 4. *Herb. Cliff.*

M. rotundifolia paluſtris. *Moriſ. ſect.* III. *t.* 7. *f.* 6.

M. aquatica ſive Siſymbrium hirſutius. *Bauh. Hiſt. v.* 3. *p.* 2. 224. *Herb. Buddle.*

M. paluſtris ſpicata. *Riv. Monop. Irr. t.* 49.

Siſymbrium hirſutum. *Raii Syn. ed.* 2. 341. *ed.* 3. 233. *Herb. Buddle.*

S. hirſutum, folio anguſtiore et acutiore, minimè ramoſum, D. Rand. *Herb. Buddle.*

S. ſylveſtre. *Dalech. Hiſt.* 677.

Origanum vulgare. *Fl. Dan. t.* 638!

β, Mentha Siſymbrium dicta hirſuta, glomerulis ac foliis minoribus ac rotundioribus. *Dill. in Raii Syn.* 233. *t.* 10. *f.* 1.

γ, M. piperita. *Linn. Sp. Pl.* 805. *Herb. Linn. Berg. Mat. Med.* 516.

M. aquatica ſive Siſymbrium. *Bauh. Hiſt. v.* 3. *p.* 2. 223? See M. *piperita.*

δ, M. paluſtris. *Sole Mentb.* 13. *t.* 6.

M. aquatica. *Mill. Dict. ed.* 8. *n.* 5.

M. aquatica, folio oblongo viridi glabro, ſaporis fervidiſſimi. *Herb. Buddle. et Herb. Bobart.*

Menthaſtri

Menthaſtri aquatici genus hirſutum, ſpicâ latiore. *Raii Syn. ed.* 1. 79. *ed.* 2. 124. *ed.* 3. 234. *Bauh. Hiſt. v.* 3. *p.* 2. 222. *Herb. Buddle.*

Menthaſtrum minus ſpicatum Lobelii. *Dalech. Hiſt.* 674. *How. Phyt.* 74.

M. minus. *Ger. em.* 685.

Calamintha tertia Dioſcoridis, menthaſtrifolia aquatica hirſuta. *Lob. Ic.* 510. *Dill. in Herb. Sherard.*

ε, Mentha paludoſa. *Sole Menth.* 49. *t.* 22.

In aquoſis. Fl. Auguſto, Septembri.

α, very common in watery places.—β, in the pariſh of Eaſt Borne, Suſſex, in the road to Pevenſey. *Dill.*—γ, a native of England. *Herb. Banks.*—δ, near Bocking. *Dale.* Somerſetſhire. *Mr. Sole.* In a little peninſula on the ſouth-weſt ſide of Saham meer near Watton, Norfolk, along with M. piperita γ.—ε, in Holt-fen at Streatham, near Ely; alſo in a rivulet by the ſide of Awdry-cauſeway, near Hadingham in the Iſle of Ely. *Mr. Sole.*

Herba tota magis vel minùs hirſuta, ſæpe purpuraſcens, odore forti, variabili. *Caules* erecti, ramoſi. *Folia* petiolata, ovata, ſerrata, ſubtùs pallidiora. *Spicæ* terminales, breves, capitatæ, obtuſæ, verticillis infimis plerumque remotiſſimis, axillaribus, pedunculatis; in δ longiores, cylindraceæ; in ε interruptæ, verticillis plurimis axillaribus, omnibus ſeſſilibus. *Bracteæ* ſæpiùs lanceolatæ, hirſutæ. *Pedicelli* undique hirſutiſſimi, pilis reflexis, albis, ſubinde arctè depreſſis. *Calyx* tubuloſus, ſulcatus, purpuraſcens, glanduloſo-punctatus, undique hirſutus, pilis ſurſùm curvatis, longitudine variis. *Corolla* purpuraſcens, extùs hirſutus. *Stamina* longitudine varia, in α et β exſerta.

Under the first variety of this species I comprehend every thing that has been taken in England, and indeed most other countries, for *M. aquatica* and *M. hirsuta* of Linnæus; the editor of *Fl. Dan. t.* 638 being not less singular in naming it *Origanum vulgare*, than he is in calling *Ballota nigra*, *t.* 673, *Mentha aquatica*. It varies greatly in luxuriance, degree of hairiness, and colour of the stem and foliage; but every difference in these respects is so manifestly owing to a greater or less degree of moisture, or of exposure to light, that among all the synonyms I have quoted, I can find no distinction permanent or intelligible enough to characterize even a separate variety, much less a species. What I have marked β is so distinguished only in deference to Dillenius, and more with respect to the sweet smell he attributes to it, than to any thing in its form. I have not been so fortunate as to find this variety in any old herbarium, as has been already observed under *M. odorata*.

γ differs but little in form from the common *M. hirsuta*, except in being rather more slender, of a paler hue, and the leaves somewhat less hairy. Its principal difference consists in its Pepper-mint flavour. This is the *M. piperita* of Linnæus and Bergius, cultivated in the north of Europe for Pepper-mint. Linnæus's specimen is from the Upsal garden, and has the flavour of our *M. piperita* very strong. This circumstance led him to consider it as the plant of Ray and Dillenius. I have seen British specimens exactly agreeing with it in appearance, but do not recollect to have found the same flavour in any wild one. If the *M. aquatica sive Sisymbrium* of John Bauhin be not our *M. piperita* β, it is this *piperita* of Linnæus; but that point must remain in doubt, for want of a description of the calyx. In this variety the stamina are shorter than the corolla, at least in the Linnæan specimen; in α and β they are longer.

δ is a very curious variety, for I cannot consider it as a species, though

though ſtrikingly diſtinguiſhed by its inflorescence, the *capitulum* being lengthened out into a leafleſs ſpike of ſeveral whorls, more or leſs crowded together. The lowermoſt whorl is generally axillary and pedunculated, and ſometimes is alſo elongated into a little ſpike. Buddle appears to have been the diſcoverer of this plant in England. He called it *M. aquatica, folio oblongo viridi glabro, ſaporis fervidiſſimi*; and it exiſts ſo marked in his herbarium. There is a ſpecimen of the ſame in Bobart's collection, ſent by Buddle, with a ticket of his own writing, conſiſting of the character juſt mentioned and the following remarks:

"Hæc eſt, ex ſententiâ D. Dale, Menthaſtri aquatici genus hir-
"ſutum ſpicâ latiore, J. B. 3. 222. I deſire you and your lady to
"taſte of this, and after ſome little time chewing, you will find it
"very hot. The whole face of the plant is different from Dr.
"Eale's Peppermint."

This old ſpecimen ſtill taſtes of Pepper-mint, in which, as well as every external character, it agrees with thoſe I gathered, in company with Mr. Crowe, at Saham meer. Buddle is wrong in denominating it "folio glabro," for the leaves in his own ſpecimen are by no means ſmooth on either ſide. Beneath they are paler, and conſiderably hairy. The calyx and flower-ſtalks preciſely agree with thoſe of the foregoing and following varieties. Mr. Sole's ſpecimens very nearly accord with mine, except in having only the uſual ſmell of *M. hirſuta*. I believe all the other ſynonyms above quoted are correct, though I had once great doubts concerning the figure in Lobel, Dalechamp and Gerarde, the corolla being there repreſented with a concave upper-lip. It actually aſſumes that form in ſome ſtates of the flower, both in this and other Mints; and an accurate compariſon of ſpecimens with theſe old cuts has removed my doubts. *M. paluſtris folio oblongo, Moriſ. ſect.* 11. *t.* 7. *f.* 4, in which

alſo the corolla is drawn galeated, may belong to this variety, or to the next; but I would not venture to quote it, not having obſerved the original ſpecimen in Bobart's herbarium.

The remaining variety ε is reckoned by Mr. Sole among the verticillate ſpecies, and indeed the living plants with which he favoured me proved truly verticillate, all the whorls being axillary, and the ſtem terminating in leaves; that is to ſay, it became exactly *M. ſativa*. A dried ſpecimen however, communicated alſo by Mr. Sole, has the upper whorls cluſtered together, with very ſmall leaves accompanying them, and the ſtem terminates in a blunt head of flowers, as in his *tab.* 22. This only ſhews how nearly the capitate Mints are allied to the verticillate; and I have another example of the ſame kind in the *M. aquatica* of the Linnæan herbarium, upon which, though I have found no exactly parallel ſpecimen wild in England, I beg here to offer a few remarks.

The original ſpecimen of *M. aquatica*, which Linnæus deſcribed, is really a verticillate Mint. The main ſtem has 10 whorls, 7 of them axillary, and the leaves that accompany theſe are much longer than the flowers. The 3 uppermoſt whorls more cloſely approach each other, and are accompanied by leaves ſo much ſmaller than the reſt, that the whole has a capitate appearance. This deſcription is applicable alſo to the 5 lateral branches of the ſame ſpecimen, and will be found to accord with the ſhort account in *Spec. Plant.* Yet Linnæus is ſcarcely correct in ſaying "planta non hirta." The upper leaves at leaſt are clothed with ſhort cloſe-preſſed hairs. The branches and calyx are alſo hairy. The flower-ſtalks are leſs ſo than is uſual in *M. hirſuta* or in *M. ſativa*, but they are furniſhed ſufficiently with little reflexed briſtles to decide the ſpecimen to belong to one or other of thoſe ſpecies; I hardly know which, for I really believe them not to be diſtinct, and that this *M. aquatica* of Linnæus,

Linnæus, and *M. paludoſa* of Mr. Sole, are the connecting links between the other varieties. In the Sherardian herbarium is a ſpecimen marked *M. paluſtris verticillata, Cat. Giſſ. p.* 168, I believe by Dillenius himſelf, with a quotation of Rivinus, *tab.* 48. *f.* 2, of the propriety of which I am very doubtful. This ſpecimen is cloſely allied to that of *M. aquatica* I have juſt been deſcribing. It is all over hairy in ſome degree, but not ſtrikingly ſo. The calyx and flower-ſtalks are exactly as in the uſual *M. hirſuta*. The whorls are 6 in number, of which the 3 or 4 uppermoſt are approximate, but the terminal one is ſmall, ſo that it could never be called a capitate ſpecimen. It is very tall, $2\frac{1}{2}$ feet, with long runners from the lower part.

Hence it appears that *M. aquatica* is no longer to be conſidered as a diſtinct ſpecies. If the foregoing remarks ſhould appear long and tedious, the obſcurity of the ſubject, and the great uncertainty which all botaniſts have ſo long been in, concerning the ſpecies in queſtion, muſt form my apology.

*** *Verticillatæ.*

7. MENTHA *ſativa.*

Hairy Whorled Mint.

M. floribus verticillatis, caule erecto, foliis ovatis, calyce undique hirſuto, pedicellis retrorſum hiſpidis.

α, Mentha ſativa. *Linn. Sp. Pl.* 805, (excluſis ſynonymis). *Hudſ.* 253. *Engl. Bot. t.* 448.

M. verticillata. *Linn. Syſt. Nat. ed.* 10. 1099. *Hudſ. ed.* 1. 222.

M. rivalis β, γ et δ, (nec α), *Sole Mentb.* 45.

M. ver-

M. verticillatæ varietas, hirſutiè foliorum diſcrepans. *Raji Syn. ed.* 3. 232. *ed.* 2. 124. 6. *Herb. Bobart.*

M. Siſymbriæ facie et odore, hirſuta et verticillata, D. Rand. *Herb. Buddle.*

Calamenthæ arvenſi verticillatæ ſimilis, ſed multò elatior. *Herb. Buddle.*

β, Mentha aquatica verticillata glabra, rotundiore folio. *Dill. in Herb. Sherard.*

γ, M. verticillata minima, odore fragrantiſſimo. *Herb. Buddle*; ſub M. aquaticâ exiguâ, *Dill. in Raii Syn.* 232.

M. auſtriaca. *Jacq. Auſtr. t.* 430?

In aquoſis et paluſtribus. Fl. Septembri.

α, about rivulets on the ſide of Shotover hill near Oxford, Mr. Tilleman Bobart. *Herb. Bobart.* On the banks of the river Lea, near Hackney. *Mr. Edward Forſter.* At Saham in Norfolk, and in many other places.—β, in a ditch on the left hand of Chalk's-green, going from Braintree to Leez houſe. *Dillenius.*—γ, found by Mr. Buddle, in company with Mr. Francis Dale ſen. by the ſide of the new river near the upper end of Stoke Newington. *Herb. Sherard.* On Skoulton common near Hingham, Norfolk, but with only the uſual ſmell of variety α.

Habitus, pubeſcentia, figura foliorum, et color variabilis, omninò Menthæ hirſutæ. Differt tantùm floribus omnibus verticillatis, axillaribus. Verticilli inferiores ſæpiùs pedunculati ſunt.

I can give no deſcription of this Mint which will not be a repetition

tion of the foregoing, except that the flowers are all whorled. With reſpect to the hairineſs, the form of the leaves, the pale green or purple colour, and in general the ſmell, there is no difference. I have parallel varieties of both in all theſe particulars, except indeed that I have never found the Pepper-mint flavour in any variety of *M. ſativa*; but I have an inſtance of the ſweet ſmell of *ſativa* var. γ in an old ſpecimen of *M. hirſuta* in my poſſeſſion. This however is of ſmall importance. In the calyx and flower-ſtalk they accord preciſely. The hairs which entirely clothe the former are curved upwards, thoſe which cover the latter are either curved backwards, or cloſely preſſed to the ſtalk in that direction. This circumſtance will be found a certain clue to diſtinguiſh all the varieties of this plant from every other whorled mint. Without attention to it there is no poſſibility of determining them. The ſtamina are either longer or ſhorter than the corolla, which is externally hairy. Sometimes the tube has hairs in its orifice.

It is as impoſſible to mark every fleeting variation in this Mint as in the common capitate *hirſuta*. β, collected by Dillenius, and preſerved in the herbarium of Sherard, is a lax broad ſmoothiſh-leaved variety, the ſix upper whorls of which have very ſmall leaves accompanying them; a circumſtance which occurs in ſome varieties of *Mr. Sole*'s *M. gracilis*, and ſhows an approach to the ſpiked mints. The calyx is duly hairy, and the flower-ſtalks clothed with reflexed hairs, though leſs thickly ſet than uſual.

γ is the Mint that was miſtaken for the *exigua* of Linnæus, whoſe hiſtory is to be found in the third volume of our Tranſactions. I had not, when that paper was written, diſcovered the importance of the pubeſcence upon the calyx and flower-ſtalk of this genus, or I ſhould not have aſſented to the poſſibility of Buddle's plant being the *gentilis*: neither did I ſufficiently attend to the old authors to which

it is referred. I now perceive the impoſſibility of deciding whether it may or may not be the *M. aquatica exigua* of Tragus; but I think his figure, as well as that of Lobel, much more like *arvenſis*, and the figure in Fuchſius, *p.* 291, is moſt probably *gracilis*. Dillenius therefore has been too heedleſs in his ſelection of ſynonyms here as in many other inſtances. The ſpecimens he had in contemplation are in the Sherardian collection; and as his error has cauſed much trouble to following botaniſts, they merit a particular deſcription.

In the firſt place we find the *M. gracilis* (*M. gentilis Engl. Bot. t.* 449), with a ticket marked, in the hand of Dillenius if I miſtake not, "*M. verticillata glabra, odore Menthæ ſativæ.*"—It muſt be remembered that by *M. ſativa* he means the Linnæan *viridis*. To this Sherard has added: "*M. hortenſis quarta. Dod. Angl.* 245. *M. anguſtifolia glabra, odore Menthæ ſpicatæ, D. Dale.* In the hop-ground at Bocking plentifully."

In the ſame ſheet of paper with this is Buddle's and Francis Dale's plant, the ſmall *ſativa*, the leaves of which are not ſmooth. It is inſcribed "found by Mr. Buddle in company with Mr. Francis Dale ſen. by the ſide of the new river near the upper end of Stoke Newington."

With them, in the ſame paper, is a third ſet of 3 ſpecimens paſted on one ſheet, marked, "obſerved by Mr. Francis Dale jun. by the brook down Lordſhip-lane near Stoke Newington." This has nearly ſmooth leaves, and does not materially differ from the firſt ſpecimen in this ſheet, *gracilis*. The calyx is only rather more conſtricted.

By the remark of Dillenius in the Synopſis, "foliis glabris et anguſtioribus à priori (M. arvenſi) differt," it appears beyond a doubt the plant he intended in that article, *p.* 232. *n.* 2, was this *gracilis*, with which he confounded Buddle's ſpecimen. No one would be juſtified in ſuppoſing a man of Dillenius's character and merit could

make

make ſuch a miſtake, if theſe ſpecimens did not prove it. Conſequently the article in queſtion muſt have been ſtill involved in impenetrable obſcurity without them.

I have only to add, in concluſion of this account of *M. ſativa* γ, that Mr. Crowe and myſelf obſerved upon Skoulton common, Norfolk, great plenty of a variety very cloſely agreeing with this ſweet-ſcented ſpecimen of Buddle, except in ſmell, for ours has merely the uſual ſcent of *M. ſativa*, nor has culture in dry or wet ground altered it. The figure and deſcription of Jacquin's *M. auſtriaca* come very near this. The leaves are occaſionally of a dark ſhining green, but that is accidental.

Perhaps ſome apology is neceſſary for the trivial name *ſativa*, as applied to a Mint which is never cultivated. I can only ſay the ſpecific names of *Menthæ* in general are very bad and inexpreſſive. Few perſons would prefer *verticillata*, the original denomination of this plant in Linnæus. He ſeems to have been aware of its impropriety; and the wrong ſynonyms in *Sp. Plant.* which he copied from the ſpecimen ſent him by Miller, belonging to the Mint uſually called *ſativa*, and which is really cultivated in gardens, probably led him to adopt that name. I have more eſpecially thought it not worth altering, as the ſpecies will perhaps not be kept diſtinct from *hirſuta*.

8. Mentha *acutifolia*.

Fragrant ſharp-leaved Mint.

M. floribus verticillatis, foliis ovato-lanceolatis utrinque acutis, calyce undique hirſuto, pilis pedicellorum patentibus.

Mentha verticillata. *Mill. Dict. ed.* 8. *n.* 17. *Herb. Miller.*

M. verticillata aromatica, folio longiore et acutiore. *Rand. Mſs.*
M. aquatica verticillata odoris grati. *Herb. Buddle.*

Ad fluviorum margines, rariùs. Fl. . . .
Obſerved by Mr. Rand on the ſide of the river Medway, Kent; *Buddle*; between Rocheſter and Chatham. *Miller.*

Herba hirſuta, odore ſuavi. *Caulis* erectus, bipedalis, ſubſimplex, pilis arctè deflexis. *Folia* breviùs petiolata, patentia, ovato-lanceolata, utrinque acuta, inæqualiter ſerrata, baſi apiceque integerrima. *Verticilli* numeroſi, ſeſſiles, denſi, petiolis ferè æquales, multiflori. *Bracteæ* lineari-lanceolatæ, vel ſubulatæ. *Pedicelli* hiſpidi, pilis horizontaliter patentibus, longitudine variis, ſubinde recurvatis. *Calyx* tubuloſus, undique hirſutus, imprimis ad baſin, pilis adſcendentibus. *Corolla* extùs fauceque piloſa. *Stamina* incluſa.

I know this Mint only by a ſpecimen from Miller's herbarium, preſented to me by Sir Joſeph Banks, and another in Buddle's collection. It is cloſely allied to *M. ſativa*, and perhaps may be merely another variety of *hirſuta*. The leaves however are narrower, more pointed at each end, and more unequally ſerrated. The ſmell is that of Frankincenſe Thyme, as in *M. ſativa* γ. Its moſt diſtinguiſhing character conſiſts in the hairs which clothe the flower-ſtalks being either altogether horizontal, or only occaſionally recurved at their tips, whereas in *M. ſativa* and *hirſuta* they are cloſely reflexed ſo as to touch the ſtalk with their points, and ſometimes quite depreſſed. This mark, added to the ſhape of the leaves, and the whorls being altogether ſeſſile, make me venture to deſcribe this as a diſtinct ſpecies, at leaſt till ſome botaniſt has an opportunity of inveſtigating it in its native place of growth.

9. MENTHA.

9. MENTHA *rubra.*

Tall Red Mint.

M. floribus verticillatis, foliis ovatis, caule erecto flexuoſo, pedicellis calycibuſque glaberrimis dentibus hirſutis.

Mentha ſativa. *Sole Mentb.* 47. *t.* 24.
M. verticillata. *Raii Syn. ed.* 3. 232. *Riv. Monop. Irr. t.* 48. *f.* 1?
M. criſpa. *Hort. Eyſt. Æſt. ord.* 7. *t.* 5. *f.* 1.
M. criſpa verticillata. *Bauh. Pin.* 227. *Moriſ. ſect.* 11. *t.* 7. *f.* 2. *Herb. Bobart.*
M. criſpa verticillata, folio rotundiore. *Raii Syn. ed.* 2. 124. *Bauh. Hiſt. v.* 3. *p.* 2. 215. *Herb. Buddle. et Herb. Sherard.*
M. prima. *Dod. Pempt.* 95.
M. ſativa rubra. *Ger. em.* 680.
M. cruciata. *Lob. Ic.* 507.

In foſſis, et ad fluviorum margines. Fl. Septembri.
By Hackney river at the ferry-houſe. *Herb. Sherard.* In Peckham fields. *Dill. in Raii Syn.* North Wales and Shropſhire. *Mr. Sole.* By the road ſide between Edmonton and Enfield; alſo near Walthamſtow. *Mr. Edward Forſter.* Under a wet hedge in the road from Watton to Saham church, Norfolk, plentifully.

Herba glabriuſcula odore forti congenerum. *Caulis* 4—6-pedalis, erectus, flexuoſus, parùm ramoſus, purpuraſcens, glaber. *Folia* petiolata, latè ovata, inciſo-ſerrata, ſaturatè viridia, lucida; ſubtùs pallidiora, venis ſubhirſutis: ſuperiora minora et ſubrotunda, interdùm criſpa. *Verticilli* numeroſi, pedunculati, multiflori. *Bracteæ* lineari-lanceolatæ, apice ſubciliatæ; interiores ſetaceæ.

Pedicelli

Pedicelli teretes, purpurei, lucidi, glaberrimi. *Calyx* tubuloſo-campanulatus, reſinoſo-punctatus, glaberrimus, dentibus ciliatis, quandoque dorſo hirſutis. *Corolla* magna, purpurea, glabra, reſinoſo-punctata. *Stamina* longitudine varia.

This is a very diſtinct ſpecies of *Mentha*, often cultivated in gardens, where it is ſometimes called Heart-mint, or Red-Mint, and found wild in different parts of the kingdom; yet it has never been well underſtood by late writers. Linnæus appears not to have known it, for it is not in his herbarium, and he confounds its ſynonyms with his *M. ſativa*. Whether Hudſon comprehended this ſpecies under his *rubra*, I know no means of determining. It appears clearly to be what Ray and Dillenius intended in the places above quoted, both from what they have ſaid upon the ſubject, and the ſpecimens in all the old herbariums. Thoſe in the collection of Sherard have a number of quotations of the old authors in his hand-writing. Some other hand has added the ſynonym of Rivinus, *Mentha verticillata*. Probably this may have been done by Dillenius, for he has firſt inſerted the Mint by that name in the *Synopſis*; but I very much doubt its propriety. A looſe ticket, in the hand of Samuel Dale I believe, has the ſynonym of C. Bauhin, and "I have found this in three ſeveral places." On another looſe ticket is written with a pencil, in a hand I am unacquainted with, "Odor Menthæ hortenſis. Hackney river at the ferry houſe. Sept. init." Hence we learn that the conjecture of Mr. Edward Forſter, of the *M. ſativa* of Linnæus being the mint Dillenius had from the Hackney river, ſee *Engl. Bot.* 448, however probable, is not exactly true. Dillenius indeed as well as Ray confounded *M. ſativa* with the mint of the Hackney river; but I ſuſpect they did ſo from the report of Bobart and his brother, without comparing ſpecimens. My reaſons for this

this conjecture are as follows. There is not to be found in the collections of Buddle or Sherard any ſpecimen of *M. ſativa* with marks of its having been gathered by Tilleman Bobart at Shotover, or with any indication of its being the ſuppoſed hairy variety of the *M. verticillata* of the Synopſis. We learn thoſe particulars only from Bobart's herbarium. In that collection is a paper of the tall Red Mint, my *rubra*, marked with ſeveral of the ſynonyms I have adopted. With this is one looſe ſpecimen of *M. ſativa*, and a note in Buddle's writing, ſaying, "I want your brother Tilleman's variety of this, *hirſutie foliorum diſcrepans.*" Hence I conclude *M. ſativa* to be that ſuppoſed variety, of which perhaps James Bobart had no duplicate to ſend Buddle, and he might put his note to the ſpecimen as a memorandum to procure him the plant at ſome future opportunity, which ſeems never to have happened, as it is not in Buddle's herbarium at preſent.

It is certainly very wonderful that any botaniſt could confound *M. ſativa* with the plant now under conſideration, even without attending to the calyx and flower-ſtalks, which in the *rubra* are always perfectly ſmooth, except a few hairs on the margin, rarely on the back, of the teeth of the calyx. The ſmooth reddiſh zigzag ſtem, with a very few ſhort branches curved in various directions, riſing to the height of 5 or 6 feet when ſupported by buſhes; the deep-green ſhining nearly ſmooth leaves; the large handſome purple flowers; readily diſtinguiſh the *M. rubra* from all others, nor is it liable to the variations to which moſt ſpecies are ſubject.

10. MENTHA *gentilis.*

Buſhy Red Mint.

M. floribus verticillatis, foliis ovatis, caule ramoſiſſimo patulo, calycibus baſi, pedicelliſque, glabris.

Mentha gentilis. *Linn. Sp. Pl.* 805.
M. rubra. *Sole Menth.* 41. *t.* 18.

β, M. rivalis α. *Sole Menth.* 45. *t.* 20.

γ, M. variegata. *Sole Menth.* 43. *t.* 19.
M. arvenſis verticillata verſicolor. *Moriſ. ſect.* 11. *t.* 7. *f.* 5. *Herb. Buddle.*
M. criſpa verticillata. *Herb. Cliffort.*

In aquoſis et ruderatis rariùs. Fl. Auguſto.
α, in pools and brooks between Mole and Llanrooſt, North Wales. *Mr. Sole.* β, in Lock's-brook between Weſton and Twerton, Somerſetſhire. *Mr. Sole.* γ about towns, but ſcarcely to be met with truly wild.

Herba ſubhirſuta. *Caulis* erectus, pedalis (in β tripedalis), ſcaber, ramoſiſſimus, ramis elongatis, patentibus. *Folia* petiolata, ovata, obtuſiuſcula, ſerrata, lætè viridia, utrinque pilis ſparſis brevibus ſubhirſuta, venis ſubtùs albidis, omnia ferè conformia; in β longiora et ſubelliptica; in γ variegata. *Verticilli* ſubſeſſiles, multiflori; in γ interdum longiùs pedunculati. *Bracteæ* lanceolatæ, magnitudine variæ. *Pedicelli* teretes, purpurei, ſæpiùs glaberrimi; in γ ſubinde parùm hirſuti, pilis deflexis. *Calyx* tubuloſo-campanulatus, ſupernè hirſutus, pilis adſcendentibus; baſi glaber; undique

dique reſinoſo-punctatus. *Corolla* pallidè purpuraſcens. *Stamina* incluſa.

Mr. Sole's ſpecimen of his *M. rubra* moſt preciſely agrees with the original Linnæan ſpecimen of *gentilis*, and it is on his authority I reckon this among the Britiſh Mints. His *rivalis* α appears to me the ſame in every eſſential point, differing only in having a taller ſtem, and the lower leaves more elliptical. His figure indeed bears more reſemblance to ſome of the ſuppoſed varieties of this ſpecies, which I have already referred to *ſativa*, more eſpecially in the hairineſs of the calyx. We muſt not however pay too much attention to that circumſtance in any of Mr. Sole's plates, his artiſts (however excellent) not having had it in view. Nor is it fair to charge any body concerned with neglect on that account, the moſt acute botaniſts having never conſidered the pubeſcence of the calyx or flower-ſtalk as of any material importance in this genus.

The variegated Mint, ſo common in gardens and about cottages, agrees with the Linnæan *gentilis* in every particular, and not with *arvenſis*, to which Bobart referred it in Moriſon's work. In one part of Buddle's herbarium it is marked *Calamintha ocymoides* of Tabernæmontanus; and indeed his figure is not unlike it. In the Cliffortian herbarium it is erroneouſly named *M. criſpa verticillata*. I find by a ſpecimen from Bobart in Buddle's collection, and another in his own at Oxford, that he at one time ſuppoſed this variegated Mint to be *M. arvenſis verticillata, folio rotundiore, odore aromatico*, of Vernon. *Raii Syn. ed.* 2. 123. But as he has omitted this ſynonym in Moriſon's work, he probably altered his opinion; and indeed I have a ſpecimen of a different plant which appears more likely to be that of Vernon, as will be mentioned under *M. arvenſis*.

This variegated variety is liable to have all its whorls elevated on footſtalks above half an inch long, in which caſe the bracteæ are more numerous as well as larger. In a very dry gravelly garden I have obſerved, among a thouſand ſpecimens, ſome few more downy in every part than the reſt, and in theſe only the calyx and flower-ſtalks alſo were hairy. But this is a very rare alteration in Mints, nor do I know another inſtance of it. The direction of theſe hairs was almoſt as in *M. ſativa*; whereas in *arvenſis* they are ſtrictly horizontal: a diſtinction that will always be found very important.

II. MENTHA *gracilis.*

Narrow-leaved Mint.

M. floribus verticillatis, foliis lanceolatis ſubſeſſilibus, caule ramoſiſſimo erecto, calycibus baſi pedicelliſque glaberrimis.

α, Mentha gracilis. *Sole Mentb.* 37. *t.* 16.
M. gentilis. *Engl. Bot. t.* 449. *With.* 524.
M. rubra. *Hudſ.* 252.
M. fuſca ſive vulgaris. *Raii Syn. ed.* 1. 78. *ed.* 2. 123. *ed.* 3. 232. *Herb. Buddle.*
M. verticillata glabra, odore M. ſativæ (viridis). *Herb. Sherard.*
M. anguſtifolia glabra, odore M. ſpicatæ. *Dale in Herb. Sherard.*
Balſamita officinarum. *Hort. Eyſt. Æſt. ord.* 7. *t.* 3. *f.* 3.

β, Mentha pratenſis. *Sole Mentb.* 39. *t.* 17.

γ, M. gentilis. *Sole Mentb.* 35. *t.* 15.
M. hortenſis verticillata, Ocymi odore. *Moriſ. ſect.* 11. *t.* 7. *f.* 1. *Herb. Buddle.*

M. car-

M. cardiaca. *Ger. em.* 680, ex icone.

M. verticillata minor, acuta, non criſpa, odore Ocymi. *Bauh. Hiſt. v.* 3. *p.* 2. 216, ex deſcr.

In aquoſis, pratiſve humidis. Fl. Auguſto.

α, at Bocking and Stoke-Newington. *Herb. Sherard.* Near Walthamſtow. *Mr. B. M. Forſter.* Near Bradford, Wilts. *Mr. Sole.* At Saham, Norfolk. β, in the New Foreſt, Hants. *Mr. Sole.* γ, frequent in ditches and waſte places near towns and villages, but ſcarcely wild. *Mr. Sole.*

Herba ſubhirſuta. *Caulis* erectus, ſeſquipedalis, ſcaber, rubicundus, medio præcipuè ramoſiſſimus. *Folia* ſubſeſſilia, uniformia, lanceolata, acuta, ſerrata, baſi anguſtata, lætè viridia, utrinque pilis brevibus ſubhirſuta; in β deflexa. *Verticilli* multiflori, ſæpiùs ſeſſiles, interdum pedunculati. *Bracteæ* lanceolatæ, hirſutæ. *Pedicelli* teretes, purpurei, omninò glaberrimi. *Calyx* tubuloſo-campanulatus, purpureus, reſinoſo-punctatus; baſi glaberrimus; apice dentibuſque hirſutus, pilis albis, erectis. *Corolla* purpurea, apice barbata. *Stamina* incluſa.

When the deſcription in *Engl. Bot. p.* 449 was written, I ſuppoſed this Mint not to be ſpecifically diſtinct from *M. gentilis* of Linnæus. To this I was led by the exact agreement of their calyxes and flower-ſtalks, except indeed that the latter, as well as all the lower part of the calyx, are more conſtantly and completely ſmooth and poliſhed in *M. gracilis* than in the preceding. Mature conſideration has now induced me to ſeparate them, and it is never too late to correct an error. *M. gracilis* has lanceolate, ſharp-pointed, ſharply ſerrated and almoſt ſeſſile leaves, more upright branches, and the

ſmell of *M. viridis*, at leaſt in the moſt common variety, α.—β has the flavour of *M. piperita*, and is beſides remarkable for its deflexed leaves. The very near reſemblance in ſenſible qualities of theſe two varieties to the two ſpecies juſt named, led me at one time to ſuſpect the inflorescence had here again deceived us, and that they were only varieties of thoſe ſpiked Mints. A careful examination of tha important part, the calyx, however, guarded me againſt this error, at leaſt as far as *M. piperita* is concerned. The calyx of that ſpecies is much longer, leſs campanulate, and more acutely ribbed than in any variety of *M. gracilis*; in ſhort its form and appearance, without adverting to other parts of the plant, ſufficiently prove them to be diſtinct. In *M. viridis* I am obliged to confeſs the calyx moſt preciſely accords in every particular with that of *gracilis*. But the leaves of the latter being attenuated at the baſe, and by no means ſo ſtrongly veined, or rugoſe, as in the *viridis*, even without conſidering the inflorescence, prevent us from confounding them. I ſpeak now of *gracilis* α; for in β and γ the leaves are much leſs attenuated at the baſe, and more approach to an ovate form. γ is the mint Caſpar and John Bauhin characterized by its ſmell, which they juſtly compared to *Ocymum* or Sweet Baſil. This is not perceptible in all ſtages of its growth, but very permanent in dried ſpecimens, in which it reſembles the flavour of Muſcadel Grapes. In this plant the leaves that accompany the flowers are ſo very much ſmaller than the reſt, and often ſo like bracteæ, they almoſt reduce it to the ſpiked diviſion of the genus. It is indeed a moſt puzzling plant. Perhaps it ought to be reckoned a ſpecies, and arranged next to *M. viridis*. This is a point I muſt leave to thoſe who can ſtudy it in a truly wild ſtate. In garden ſpecimens I find the floral leaves vary too much in ſize to enable me to come to any poſitive determination.

12. MENTHA

12. MENTHA *arvenſis.*

Corn Mint.

M. floribus verticillatis, foliis ovatis, caule ramoſiſſimo, calycibus campanulatis undique hirſutis pilis patentibus.

Mentha arvenſis. *Linn. Sp. Pl.* 806. *Hudſ.* 253. *With.* 524. *Hull.* 128. *Relh.* 224. *Sibth.* 182. *Abbot.* 127. *Sole Mentha.* 29. *t.* 12. *Fl. Dan. t.* 512.

M. floribus verticillatis, foliis ovatis acutis ſerratis. *Linn. Hort. Cliff.* 307. *n.* 5. *Herb. Cliff.*

M. verticillata hortenſis odore Ocymi C. B. Pin. *Herb. Cliff.* nec Bauhini.

M. aquatica. *Raii Syn. ed.* 1. 78.

M. ſeu Calamintha aquatica. *Raii Syn. ed.* 2. 123. *ed.* 3. 232. *Herb. Buddle.*

M. arvenſis verticillata procumbens. *Moriſ. ſect.* 11. *t.* 7. *f.* 5.

Calamintha aquatica. *Ger. em.* 684. *How. Phyt.* 18. *Merr. Pin.* 18.

β, Mentha arvenſis major, verticillis et floribus amplis, foliis latioribus, ſtaminibus corollâ longioribus, odore grato. *Sole Mentha.* 29, γ.

γ, M. præcox. *Sole Mentha.* 31. *t.* 13.

δ, M. gentilis. *Mill. Dict. ed.* 8. *n.* 15. *Herb. Mill.*

M. verticillata, rotundiore folio, odore Ocymi. *S. Dale. Mſs.*

M. verticillata glabra, foliis ex rotunditate acuminatis, Buddle. *Herb. Buddle & Herb. Bobart.*

M. arvenſis verticillata, folio rotundiore, odore aromatico. *Raii Syn. ed.* 2. 123? *ed.* 3. 232?

ε, M. agreſtis. *Sole Mentha.* 33. *t.* 14.

In arvis inundatis, præcipuè arenoſis. Fl. Junio, Julio.

γ, in moiſt meadows. *Mr. Sole.* δ, on the right hand of the road from Bocking to Goſsfield, Eſſex. *Mr. Dale.* At Shelford, Cambridgeſhire; Mr. Wigmores. *Ray?* ε, common in corn-fields and neglected gardens about Mendip hills, Shepton-Mallet and Frome, Somerſetſhire. *Mr. Sole.*

Herba magis vel minùs piloſa, odore forti, ſæpiùs peculiari et ingrato. *Caulis* ramoſiſſimus, plerumque diffuſus; in γ et ε erectus. *Folia* petiolata, ovata, ſeu elliptico-ovata, obtuſiuſcula, variè ſerrata; in ε rugoſa, et ferè cordata. *Verticilli* multiflori, ſubſeſſiles. *Bracteæ* lanceolatæ, ſubtùs hirſutæ. *Pedicelli* teretes, apice purpuraſcentes, ſæpe glaberrimi, interdum plus minus hirſuti, pilis ſparſis, ſubreflexis. *Calyx* brevis, campanulatus, obſoletiùs ſulcatus, reſinoſo-punctatus, undique piloſus, pilis horizontaliter patentibus. *Corolla* dilutè purpurea, extùs piloſa. *Stamina* in α et β exſerta, in γ, δ et ε incluſa.

The common *M. arvenſis* is one of the few Mints that every botaniſt calls by the ſame name. It is met with in the borders, or between the furrows, of corn-fields, eſpecially in places where water has ſtagnated in the winter. Its pale-green downy ſurface, branched diffuſe ſtem, and eſpecially a peculiar ſtrong odour which comes from every part of the herb when touched, and which moſt people compare to that of blue mouldy cheeſe, readily diſtinguiſh it. To which may be added the campanulate ſhort figure of its calyx, and the long hairs which entirely clothe that part projecting horizontally. If this circumſtance be attended to, it can never be confounded with any of the preceding. The flower-ſtalk is round, poliſhed, purple in the upper part, often quite ſmooth, but for the moſt

moſt part clothed with a few ſcattered hairs, rather pointing downwards, moſt numerous about the upper half of the ſtalk. The ſpecimen in the Cliffortian herbarium, referring to n. 5 of *Hort. Cliff.* has the flower-ſtalks more hairy than uſual. Another in the ſame collection, which I have cited above, has them nearly ſmooth.

My 2d variety β, Mr. Sole's third, differs very little indeed from the common one, except in being rather larger, from its ſituation in wet meadows. The ſtamina in both are for the moſt part longer than the corolla. Mr. Sole's 2d variety I have not ſeen. He deſcribes it with a reddiſh upright ſtem, narrow leaves, and a pleaſant ſmell.

γ flowers earlier than the common kind, and has a more ſhining ſurface, though clothed with ſhort hairs. The leaves alſo are more recurved and elliptical. In ſmell I can find no difference, nor can I diſcover any thing on which to found a ſpecific diſtinction. The ſtamina being ſhorter than the corolla cannot be thought ſufficient.

δ I know only by the original ſpecimen in my poſſeſſion, gathered by Dale, and deſcribed by Miller as *gentilis*. I have never ſeen it living. The ſpecimen in Buddle's herbarium differs only in having the baſe of the calyx perfectly ſmooth, whereas in mine that part is all over hairy. The leaves are ſhorter and broader than in common *arvenſis*, but no other difference is diſcernible. The ſcent of Baſil, which Dale attributes to it, can only mark it as a variety.—I think there is the greateſt probability of this being Mr. Vernon's aromatic mint mentioned in Ray's *Synopſis*; but having ſeen no original ſpecimens, I quote it with heſitation. In Buddle's herbarium is a ſpecimen of *M. ſativa* γ, with rounder and ſhorter leaves than uſual, found in 1710 by the Thames' ſide near the Neat-houſes, Chelſea, by himſelf in company with Mr. Rand, which he ſays they agreed to be Vernon's plant. Hence it appears that plant was even then

then only to be determined by gueſs, and Dillenius has merely copied it into his edition of the *Synopſis* without any additional remark. Bobart, as I have already mentioned, once took the variegated *gentilis* of the gardens to be the Mint of Vernon. I know not that this uncertainty can ever be removed, except ſome old herbarium ſhould unexpectedly afford an original ſpecimen.

ε is a very remarkable plant, for which I am obliged to Mr. Sole, the only perſon I believe who has found it; and I have been much inclined to make it, as he does, a diſtinct ſpecies. Its leaves are very broad and almoſt heart-ſhaped, marked with ſtrong parallel veins which render them rugoſe. The ſtamina are ſhorter than the corolla. In every other particular, even in ſmell, it agrees perfectly with *M. arvenſis*, eſpecially in the calyx and flower-ſtalk; and I think it muſt be conſidered as a variety, for I have abundant proofs that the ſhape of the leaves is more liable to vary in this ſpecies than even moſt others.

13. MENTHA *Pulegium.*

Penny-Royal.

M. floribus verticillatis, foliis ovatis, caule proſtrato, pedicellis calycibuſque undique tomentoſis: dentibus ciliatis.

Mentha Pulegium. *Linn. Sp. Pl.* 807. *Hudſ.* 254. *With.* 525. *Hull.* 130. *Relh.* 224. *Sibth.* 182. *Woodv. Med. Bot. t.* 171. *Sole Menth.* 51. *t.* 23.

Pulegium. *Raii Syn. ed.* 1. 79. *ed.* 2. 125. *ed.* 3. 235. *How. Phyt.* 99. *Merr. Pin.* 99. *Bauh. Hiſt. v.* 3. *p.* 2. 256. *Fuchſ. Hiſt.* 198. *Riv. Monop. Irr. t.* 23. *f.* 1.

P. regium. *Ger. em.* 671.

Pulegium, *herba, flos. Pharmac. Lond.*

In

In ericetis et paſcuis humidis. Fl. Septembri.

Herba odore acri, aromatico. *Caules* proſtrati, ramoſiſſimi, repentes, piloſi, angulis obtuſiuſculis. *Folia* parva, petiolata, ovata, obtuſa, crenato-ſerrata, ſubtùs præcipuè ſubhirſuta. *Verticilli* ſeſſiles, pro foliorum ratione magni, numeroſi, multiflori. *Bracteæ* nullæ. *Pedicelli* tomentoſo-incani, ſeu pilis breviſſimis, denſiſſimis, undique tecti.—*Calyx* tubuloſus, gracilis, ſulcatus, reſinoſo-punctatus, pilis denſis, brevibus, porrectis, undique veſtitus, dentibus ciliatis, acutis, inæqualibus, fauce villis albis conniventibus clauſâ. *Corolla* calyce duplò longior, purpurea, baſi alba, extùs villoſiſſima. *Stamina* exſerta.

Penny-royal cannot be confounded with any other Britiſh Mint, nor is it ſubject to any varieties worth notice. Culture makes it more luxuriant and erect. Sometimes the flower is white. There are ſome foreign ſpecies carefully to be diſtinguiſhed from it by the different hairineſs of the calyx, as well as other marks. They agree with it in the ſhort ſoft cloſe downineſs of its flower-ſtalks, by which, without regarding its ſmall leaves, and different habit, it is decidedly diſtinguiſhed from every other Britiſh ſpecies. This difference confirms the remark I have ſo often made, of the importance of thoſe parts in characterizing the ſpecies throughout the whole genus.

XX. *On two Genera of Plants belonging to the Natural Family of the Aurantiæ. By Joſeph Corrêa de Serra, LL.D. F.R.S. & L.S.*

Read July 2d, 1799.

THE object of this paper is to examine the generic characters and the natural affinities of the *Crateva Marmelos* of Linnè, and of the *Crateva Balangas* of Kœnig; two plants, each of which I conceive to be a genus by itſelf, not only diſtinct from the *Crateva*, but alſo belonging to a different natural order.

Among the many advantages deriving to botany from the progreſs made of late in the knowledge of the natural affinities of plants, one of the moſt obvious is the facility it affords in many inſtances, of recalling to their natural places, plants which, by overſights unavoidable in artificial ſyſtems, even the moſt ingenious, had been aſſociated to extraneous genera. Of this advantage the examination of the two plants above mentioned will, I preſume, afford an example.

The affinity of the genus *Crateva* (ſuch as it was firſt conſtituted by Plumier *, and adopted by Linnè †,) to all the genera of the *Capparides*, is obvious to every inquirer of natural affinities. However different the principles might have been on which natural arrangements of plants have been attempted, this aſſociation has been al-

* Under the name of Tapia. *Plum. Nova. Plant. Gen. p.* 22. *t.* 21.

† In the firſt edition of *Gen. Pl. p.* 113.

ways acknowledged as ſtrictly natural. To the ſagacity and profound ſcience of Juſſieu we are of late indebted for the conſtant and almoſt excluſive characters which diſtinguiſh this family, and circumſcribe its affinities. He remarked, that the ſeeds in this natural order contain a crooked embryo without periſperm; that their placentation is always parietal, in a fruit which in conſequence muſt be moſtly unilocular *.

The *Crateva marmelos* of Linnè, and the *Crateva balangas* of Kœnig, I have obſerved in the herbarium of the Right Hon. Sir Joſeph Banks, and I have received the fruits of both from him. Upon examining the fruits I have found that their ſeeds contain a ſtraight embryo with a ſmall radicula, and fleſhy, large, plano-convex cotyledons; and that their placentation is central, in a multilocular fruit: they cannot therefore be ſpecies of *Crateva*. The further examination of the other parts of their fructification confirms this firſt opinion, and, ſhewing how far they differ from the *Crateva* in other important points, gives us a clue to find their proper place in the natural ſyſtem.

But before I proceed to the deſcription of the fructification of theſe two plants, as I intend to deviate in ſome manner from the common method of deſcribing, I muſt give the reaſons which perſuade me of the utility and perhaps neceſſity of the alterations I adopt, and ſhow that ſingularity, or ſpirit of innovation, are not my motives, but that the preſent ſtate of ſcience requires, in ſome manner, this change of method.

Of the ſix diviſions in the Linnæan method of deſcribing genera, four relate to the flower, and exiſt at the ſame period, viz. the calyx, coroll, ſtamina, and piſtill; the other two exiſt after the decay of the preceding, viz. the pericarp and the ſeed. They are the off-

* *Juſſieu Gen. Pl. p.* 246.

ſpring of the flower rather than a part of it; and their ſtructure at the period when they are the objects of obſervation and deſcription, has often received material alterations from their ſtate when in the flower. Linnè conſidered them in this light, when he deſcribed the germen, that is to ſay, the fruit as it exiſts in the flower, as a part of the piſtill; and again deſcribed it in the articles of pericarp and ſeed, to ſhow its ſtructure as it exiſts, long after the decay of the flower, when ripe and perfect.

Former botaniſts having given great attention to the calyx and coroll, and the ſexual ſyſtem being founded on a minute conſideration of the ſtamina and piſtill, theſe four parts are accurately and carefully exhibited in the Linnæan deſcriptions of genera, but this is not the caſe with reſpect to the fruits or the ſeeds. We are at preſent enabled, by the obſervations of Juſſieu, Gærtner, and a few other botaniſts, to deſcribe theſe important objects with an accuracy unknown to former ages, and to collect from the detail of their parts a number of characters, (many of them of great weight,) which, multiplying the points of compariſon, eſtabliſh more firmly the degrees of affinity or difference betwixt plants, and thereby lead us to a more intimate knowledge of their nature. Even in the deſcription of the flower, the progreſs made by botany ſince the death of Linnè requires perhaps ſome change: 1ſt, Becauſe the inſertion of the ſtamina, a character of a ſuperior order, was by him carefully marked only in the Icoſandria, Polyandria, and Gynandria, in which claſſes it is (if I may be allowed the term) the claſſific character. 2dly, Becauſe in proportion as that multitude of different organs which go by the general and in many inſtances unmeaning name of *nectarium*, are phyſiologically diſcriminated, and accurately defined, the neceſſity of marking them for what they are in nature, is more and more ſenſibly felt. And 3dly, becauſe the *germen* itſelf, as a part of the flower,

varies

varies very often, in number of loculaments and of ſeeds, from the ripe fruit.—The compariſon of theſe two ſtates, of the ſame object, requires an attention, from thoſe who ſeek the ways of nature, far greater than has been hitherto beſtowed on it.

Theſe reaſons, I hope, will be a ſufficient excuſe in the eyes of every candid Botaniſt, for my attempting to deſcribe the fructification of the plants which are the ſubject of this paper, in twelve, inſtead of ſix diviſions, in the following manner:

1. The *flower*, in the four uſual Linnæan diviſions of *calyx*, *coroll*, *ſtamina*, and *piſtill*; marking, however, the inſertion of the ſtamina, and the nature of what Linnè, in analogous plants, has called nectarium.

2. The *fruit*, in four diviſions, viz. the parts of the flower which perſiſt and accompany the fruit, and which I deſign by the name of *induviæ*, the *pericarp*, the *placentation* of the ſeeds, and the *dehiſcentia*.

3. The *ſeed*, in four diviſions, viz. its *form*, its *integuments*, the *periſperm*, and the *embryo*.

The two genera which we are now to conſider are deficient in ſome of theſe parts; but it is equally intereſting to the Botaniſt to know the abſence of ſuch parts, as to be acquainted with their form when preſent. What new terms I am obliged to employ ſhall be explained in the notes.

The

The following is the fructification of the *Crateva marmelos* of Linnè, to which, conceiving it to be a new genus, I give the name of

ÆGLE *.

* FLOS.

CAL. *Perianthium* monophyllum parvum quinquelobum fructum non comitans †.

COR. *Petala* quinque calyce multotiès majora, patentia ovato-acuta.

STAM. *Filamenta* plurima brevia ſubulata in receptaculi elevati, ſeu diſci hypogyni parte externa inſerta; *Antheræ* oblongæ erectæ.

PIST. *Germen* ovatum ſuperum. *Stylus* brevis craſſus. *Stigma ovale* (ſulcis plurimis obſoletè ſulcatum juxta Kœnig).

** FRUCTUS.

INDUVIÆ nullæ.

PERIC. *Bacca* corticoſa turbinato-globoſa, cortice glabro ſcrobiculato per maturitatem lignoſo. *Loculamenta* (in meo ſpecimine) decem cincta carne ſpongioſa, poſt maturitatem evanida.

PLACENT. *Chorda piſtillaris* ‡ compoſita centralis; chordulæ par-

* One of the Heſperides.

† The calyx remains after the flowers decay, but falls before the maturity of the fruit; as I have ſeen in the ſpecimens which I have obſerved.

‡ In every fruit, properly ſo called, there is a longitudinal bundle of fibres and veſſels which may be traced from the inſertion of the fruit in the receptacle to the ſtigma: to this bundle the ſeeds are affixed, from it they originated, and through it they are moſt probably fecundated. This important bundle I call *chorda piſtillaris*.

tiales

tiales tot quot loculamenta axi ſuberoſo coalita. Semina in unoquoque loculamento plurima ſimplici ſerie diſpoſita, funiculo umbilicali recto brevi chordulis affixa.

DEHISC. nulla.

*** SEMEN LIBERUM.

FORMA. Semen ſubovatum compreſſum, versus umbilicum anguſtatum, piloſum.

INTEG. duplex; exterius coriaceum pilis intertextis glutinoſis veſtitum; interius membranaceum ad alterum latus funiculo adnato ſtipatum in obtuſiori parte chalaza lata ferruginea notatum.

PERISP. nullum.

EMBR. ſemini conformis luteſcens, cotyledones duo plano-convexæ carnoſæ, radicula minima.

This deſcription is made from ſpecimens ſent from India by Dr. Roxburgh, Dr. Ruſſel, Dr. Koenig, and by the Moravian miſſionaries of Tranquebar.

Two ſeemingly diſtinct ſpecies of this genus exiſt in the herbarium of Sir Joſeph Banks, both arboreous, and both growing in the Eaſt Indies. To that which has been known under the name of *Crateva marmelos*, I continue the old trivial name, and call it *Ægle marmelos*.

The

The *Crateva balangas* of Kœnig, known to the Engliſh in the Eaſt Indies by the name of Elephant apple, has the following fructification; and, as a new genus, I give it the name of

FERONIA*.

* FLOS.

CAL. *Perianthium* monophyllum quinquepartitum planum parvum (deciduum ex Kœnig.)

COR. *Petala* quinque oblonga acuta patentia calyce multotiès longiora.

STAM. *Filamenta* decem, baſi lata compreſſa, utrinque ad baſin villoſiſſima, erecta, in receptaculo elevato ſeu diſco hypogyno inſerta. *Antheræ* obovatæ erectæ.

PIST. *Germen* ſubovatum ſuperum. *Stylus* brevis conicus. *Stigma* acutiuſculum.

** FRUCTUS.

INDUVIÆ nullæ.

PERIC. *Bacca* corticoſa turbinato-ovata, cortice aſpero per maturitatem lignoſo. *Loculamenta* plura, carne fungoſa obvoluta.

PLACENT. *Chorda piſtillaris* compoſita centralis; chordulæ partiales, tot quot loculamenta, in baſi et apice pericarpii tantùm unita, cæterùm plus minuſve per maturitatem ? divergentia. Semina in unoquoque loculamento plura, ſimplici ſerie diſpoſita funiculo umbilicali lato chordulis affixa.

DEHISC. nulla.

* One of the Deities to whom the Ancients dedicated Foreſts.

*** SEMEN.

*** SEMEN LIBERUM.

FORMA. Semen ovatum lenticulari compreſſum piloſum.

INTEG. duplex; exterius membranaceum pilis intertextis veſtitum, interius coriaceum, in obtuſiori parte chalaza lata ferruginea notatum.

PERISP. nullum.

EMBR. Semini conformis albeſcens, cotyledones duæ plano-convexæ carnoſæ, radicula minima.

This genus I have deſcribed from ſpecimens ſent from India by Dr. Ruſſel and Dr. Kœnig. We are acquainted with only one ſpecies, a tree growing in the foreſts of India, which I call *Feronia elephantum*, from the name by which it goes among the Engliſh inhabitants of the Eaſt Indies.

Plants are always better deſcribed from freſh, than from dried ſpecimens; but in order to ſatisfy myſelf, and to be able to anſwer for the characters, I have ſcrupulouſly avoided giving any which were not diſcernible in the ſpecimens before me *, though Kœnig's deſcriptions of the *Crateva marmelos* and *Balangas*, are more explicit

* For inſtance, the hilum I have not marked, in either of the two genera, becauſe I could not ſufficiently diſtinguiſh its figure. That of the *Feronia* ſeems to me worthy the attention of the botaniſts who may have occaſion to obſerve it in a freſh ſpecimen. The fleſh, which in both genera ſurrounds the loculaments, I deſcribe ſuch as it was in the dry ſpecimens after having been ſoaked. The membranes, which form the loculaments, I have not deſcribed, though eſſential parts, becauſe I conceive they muſt be very different in the freſh fruit, from what they appeared to me in the dry ſpecimens. I muſt notice, however, that their interior ſurface, in both genera, is covered with large round ſcars of dried veſicular glands, of which I will hereafter take an opportunity of ſpeaking more at large, and in a more proper place, in a Memoir on the Natural Order of the *Aurantia*.

in what reſpects the flower, having the advantage of being made from living ſubjects.

The ſeeds, the fruits, the inſertion of the ſtamina on a *diſcus hypogynus*, ſurrounded by a *calyx monophyllus*, and a coroll of a defined number of petals, ſhow to a demonſtration that theſe two genera belong to the family of the *Aurantia*. What place they are to occupy among their affinities, and conſequently what are their true eſſential and differential characters, will be diſcuſſed in a future paper on this natural order.

XXI. *Deſcriptions of the Mus Burſarius and Tubularia Magnifica; from Drawings communicated by Major-General Thomas Davies, F.R.S. & L.S. By George Shaw, M.D. F.R.S. V.P.L.S.*

Read June 4, 1799.

THE *Mus burſarius* belongs to a particular diviſion in the genus, containing ſuch ſpecies as are furniſhed with cheek-pouches for the temporary reception of their food. It ſeems not to have been yet deſcribed, or at leaſt not ſo diſtinctly as to be eaſily aſcertained. It approaches however to one or two ſpecies mentioned by Dr. Pallas, Mr. Pennant, and others; but differs in ſize, being much larger, as well as in the appearance of the fore-feet, which have claws differently formed from any of the pouched ſpecies hitherto deſcribed.

In order to ſecure its knowledge among Naturaliſts, it may be proper to form for it a ſpecific character, viz.

Mus *cinereus, caudâ tereti brevi ſubnudâ, genis ſaccatis, unguibus palmarum maximis foſſoriis.*

Aſh-coloured rat, with ſhort round nearly naked tail, pouched cheeks, and the claws of the fore-feet very large, formed for burrowing in the ground.

The cheek-pouches are far larger in proportion to the animal than in any other of this tribe, and therefore have given occaſion for the ſpecific name.

This quadruped was taken by ſome Indian hunters in the upper parts of Interior Canada, and ſent down to Quebec. It is now in the poſſeſſion of Governor Preſcot.

TAB. VIII. exhibits the *Mus burſarius* of its natural ſize.

THE *Tubularia magnifica* muſt be conſidered as by far the largeſt ſpecies of its genus yet diſcovered. It is found in various parts of the coaſt of Jamaica, adhering to the rocks. It is very ſhy, and on being approached inſtantly recedes within its elaſtic tube, which on a farther alarm alſo retires into the rock, and ſpecimens can be obtained only by breaking off ſuch parts of the ſtone as contain them. Theſe, being put into tubs of ſea-water, may be kept for months in perfect order; and from one of them ſo preſerved this drawing was made.

The ſpecific character may be thus given:

TUBULARIA *tubo ſimplici albido, tentaculis numeroſiſſimis albo rubroque variatis.*

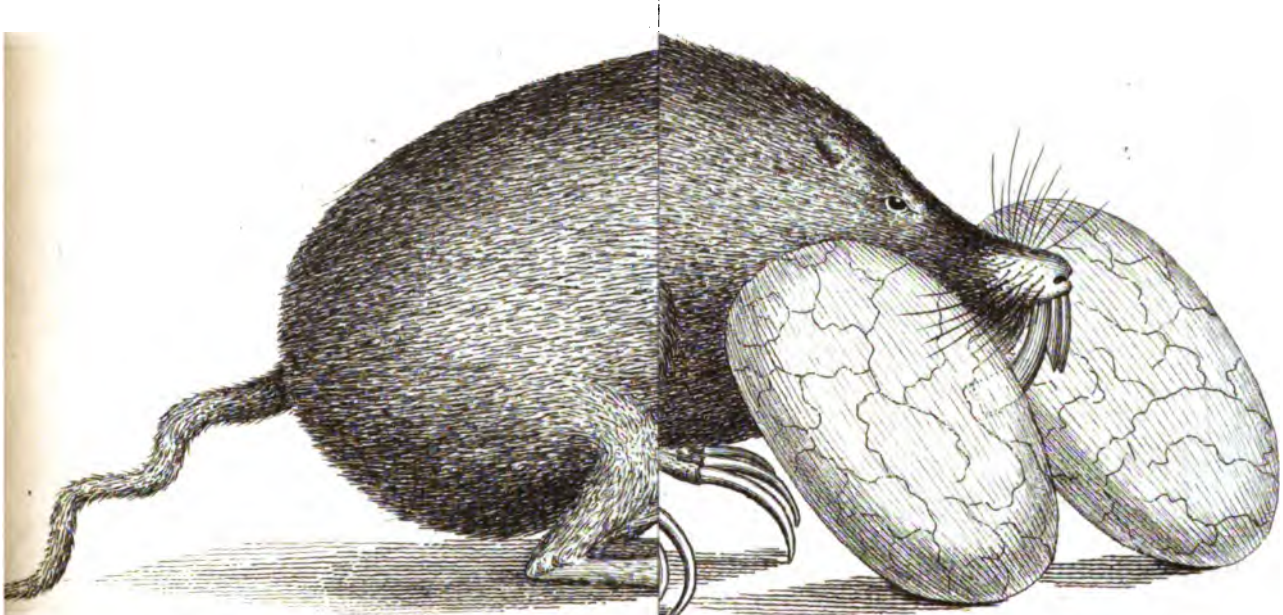
Tubularia with a ſimple whitiſh tube, and very numerous tentacula variegated with red and white.

It is neceſſary to obſerve, that, in the form of its body, at leaſt as far as can be judged from the part repreſented in the back view of the animal, it ſeems to make an approach to the genus *Amphitrite*, and may be conſidered as in ſome degree connecting theſe two genera.

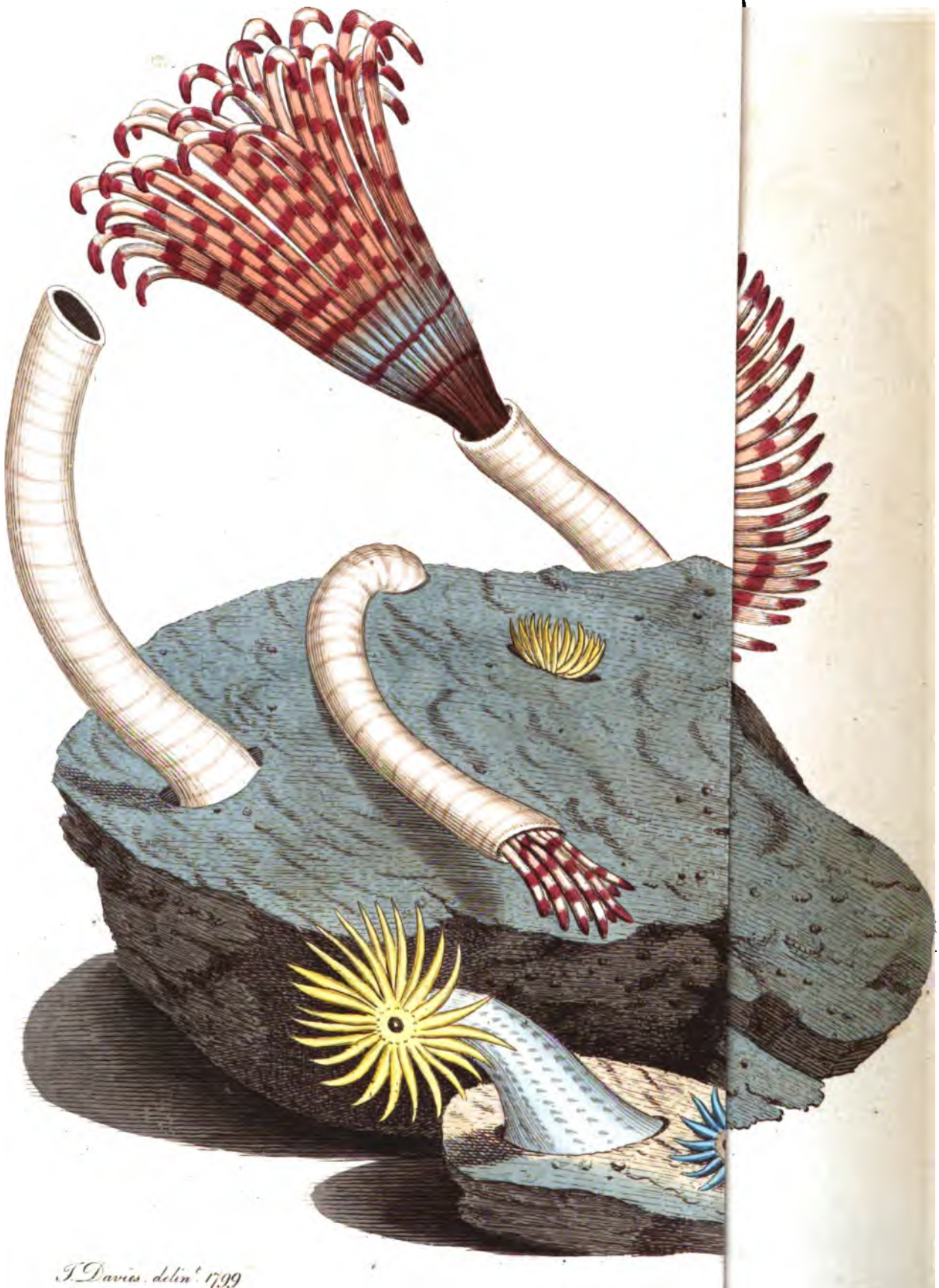
It may perhaps be doubted whether ſome of the ſmaller figures, ſuppoſed to be the young animals, may not in reality belong to ſome ſpecies of *Actinia*.

TAB.

Linn. Trans V. tab 8. p. 228.



T. Davies, delin: 1799.



J. Davis. delin.t 1799

TAB. IX. *Fig.* 1. ſhews the back of the *Tubularia magnifica*, when expanded, of its natural ſize.

2. The front.
3. The animal expanding from the tube.
4. The ſame retreating when diſturbed.
5. Entirely withdrawn into the tube.
6. Suppoſed young ones of the ſame ſpecies.

XXII. *Account of the Fluſtra Arenoſa, and ſome other Marine Productions.* By *Henry Boys, Eſq. F. L. S.*

Read June 4, 1799.

FLUSTRA *arenoſa.*

Fl. cruſtacea arenoſa lutoſa, poris ſimplicibus ſubquincuncialibus. *Ellis Zooph. p.* 17. *n.* 10. *Gmelin Syſt. Nat. v.* i. 3829. *Pallas El. Zooph. p.* 37. *n.* 5. *Ellis Corall. p.* 74. *t.* 25. *f.* c. *Raii Syn. p.* 31.

Engliſh Sea Mat.

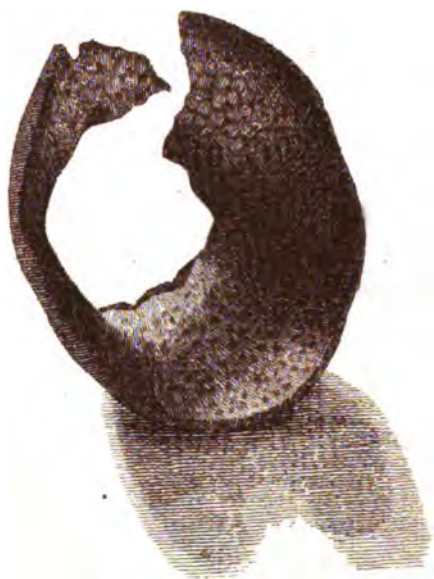
Tab. X.

IT may not be improper to tranſcribe Mr. Ellis's account of this production.

"This ſea mat is formed of ſand and ſlime into a cruſtaceous body, with ſmall mouths placed almoſt in a quincunx order."

"This was ſent me from Holyhead in Wales. Its form, when intire, was exactly like the upper ſemicircular part of a colt's hoof. The ſurface of each of the cells was a little hollow in the middle, with a ſmall hole in each. From the appearance it made when I received it intire, I judged it to be what Imperatus calls his *Lorica marina.*—There is a layer of ſand and ſlime under as well as over

Linn. Trans. V. tab. 10 p. 230.



Flustra arenosa.

Hen. Boys delineavit. 1797.

the cells which compoſe it.—It is very friable when dry. Whether it belongs to this genus or not, I ſubmit to the curious." *Ellis. Zooph. p.* 17.

Great numbers of theſe bodies are found, in the ſpring, on the ſandy ſhore between the mouth of Sandwich Haven and Deal, at low water; in ſome years more than in others; particularly in May 1797.—It is undoubtedly the nidus of ſome marine animal, as I have found the cells intire, with eggs in each.

In the ſummer ſeaſon there is frequently found on the ſame ſhore, cluſters of black roundiſh bodies united together by ſhort cords, forming very exactly the reſemblance of bunches of black grapes both as to ſize and colour. The ſubſtance is tough and elaſtic, and the bodies conſiſt of ſeveral coats, the outermoſt of which is black, and the innermoſt perfectly tranſparent; and they are filled with clear water, containing the eggs, and ſometimes the living embryos of the *Sepia officinalis.*

During the ſame ſeaſon we likewiſe meet with large maſſes of a jelly-like ſubſtance, to which are connected a number of tuberculated appendages bearing together the reſemblance of a mop; which tubercles are diaphanous, and include ſometimes the eggs and ſometimes the embryos alive of another ſpecies of *Sepia*—I think the *Loligo*, but am not certain.

XXIII. *An Account of a remarkable Variety of the Beech, Fagus Sylvatica. By Chriſtian Henry Perſoon, M. A. F. M. L. S.*

Read October 1, 1799.

TREES in general are not liable to thoſe alterations in their ſubſtantial parts that we obſerve in ſmaller plants. In ſome indeed the leaves frequently become by culture variegated with white or yellow ſpots, and in that ſtate are much admired by lovers of gardening. The Beech however is ſubject to vary, not only in the colour, but alſo in the figure of its leaves.

The beautiful variety of this tree with blood-red leaves* is pretty well known, and is multiplied by engrafting on the common kind; but being deficient in vigour, as all ſuch varieties originate in weakneſs, it does not always ſucceed.

A ſingular variety with deeply indented leaves has been diſcovered in Bohemia by Mr. Vignet†, not much unlike the laciniated variety of *Betula alnus* in figure.

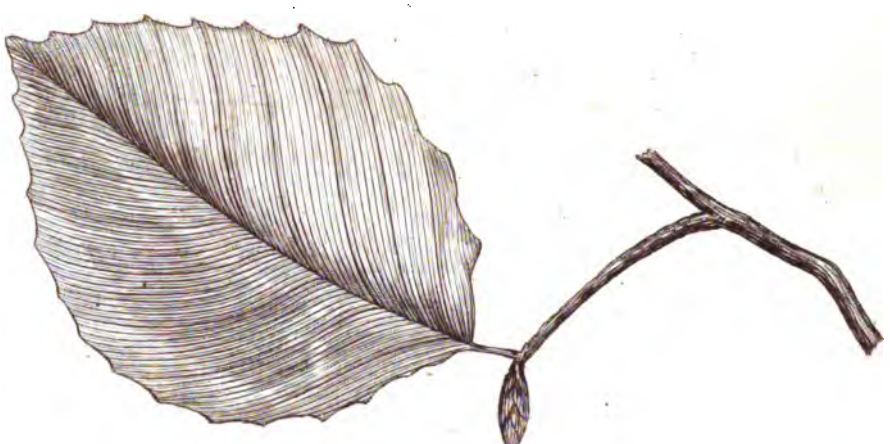
A leſs ſtriking but uſeful variety is deſcribed by Mr. Kerner, under the name of *Mandelbüche*, Almond Beech, growing wild in

* Fagus ſylvatica, var. foliis atropurpureis. *V. Burgſdorf Anleitung zur ſichern Erzgiehung der Holzarten. Th.* 2. *p.* 91. The author mentions his being alſo in poſſeſſion of a variety of the ſame tree with ſtreaked leaves.

† F. ſylvatica, var. laciniata, foliis ovato-lanceolatis acuminatis glabris profundè ſerratis: ſerraturis acutis patentibus. *A. v. Vignet Anzeige einer neu-entdeckten Buchenabart.* Vide *Schmidts Sammlung phyſicaliſch-œconomiſcher Aufſätze.* 1 *band, p.* 173. *t.* 1.

the

Linn Trans V. tab II. p. 233.



Schwenterley at Natur. del.

the Duchy of Wirtemberg, and which is remarkable for its extraordinarily large leaves and fruit *.

The ſtriking variety, of which I now beg leave to preſent a ſhort deſcription and figure to the Linnæan Society, deſerves above all others the attention of Naturaliſts. It is ſo remarkable that, if it were of frequent occurrence, it might ſeem to claim the diſtinction of a peculiar ſpecies of *Fagus*. I ſhall however conſider it only as a variety, with the following characters:

FAGUS *ſylvatica*; varietas quercoides, cortice teſſellato-ſulcato.

Not far from the village of Reinhauſſen, within about two hours ride of Göttingen, is to be ſeen a ſingle individual of this variety. The people of the country call it *Rammel-buſche*, apparently from an opinion of its having originated from the intermixture of an Oak with a Beech.

The bark of the trunk and larger branches is entirely formed like that of an Oak, by which it is at once known from other Beeches. The tree has likewiſe the crooked, and proportionably ſhort, branches of the Oak; ſo that a ſpectator at ſome diſtance, or in the winter ſeaſon, would undoubtedly take it for ſuch.

It is from 40 to 45 feet high, and eight in circumference. The trunk ſtraight and upright, moſt branching at the top. As it is hollow within, and may probably not laſt many years, having already ſome dry boughs in the upper part, it is a pity ſome attempt has not been made to increaſe it, and to ſee if culture makes any change in its nature.

TAB. XI. repreſents a piece of the bark, with a leaf, of the *Fagus ſylvatica*, var. *quercoides*.

* *J. S. Kerner's Beſchreibung und Abbildung der Bäume und Geſträuche welche in dem Herzogthum Wirtemberg wild wachſen. Stuttgart* 1793. *p.* 31.

XXIV. *Catalogue of ſome of the more rare Plants obſerved in a Tour through the Weſtern Counties of England, made in June* 1799, *by Dawſon Turner, Eſq. F.L.S. and Mr. James Sowerby, F.L.S.*

Read October 1, 1799.

THE expedition which it is in general neceſſary to employ in paſſing through a large extent of country, the want of proper books and other conveniences to examine what is found, and, above all, the ignorance of the ſpots moſt likely to prove advantageous to his reſearches, are obſtacles which every traveller, whoſe purſuit is Natural Hiſtory, muſt encounter, in a greater or ſmaller proportion. Of theſe a very conſiderable ſhare fell to our lot, the objects that we endeavoured to follow being far more numerous and extenſive than our limited leiſure would allow us to attain; for it cannot be imagined that the time left for Botany could be conſiderable, when it is known that in little more than a month we journeyed nearly a thouſand miles, ſtriving at the ſame time to beſtow attention upon the other branches of natural hiſtory, the manufactures, and the numerous antiquities with which the county of Cornwall eminently abounds.

This, then, muſt plead our excuſe (if indeed an excuſe be neceſſary) for the ſhortneſs of the following liſt, into which we have admitted no plant that we ourſelves did not ſee growing, and from which we have tried to exclude all thoſe that may not be claſſed

claſſed among the more rare productions of this kingdom; unleſs, perhaps, in the genera of *Lichen* and *Fucus*, which we conſidered as tribes ſo little known in general, that we thought we might be excuſed if we noticed all excepting the moſt common. The peculiar ſeaſon of the year of courſe prevented our meeting with either *Muſci*, *Jungermanniæ*, or *Fungi*.

We have mentioned many habitats that were before quoted by authors, but have been induced to do ſo from a deſire to ſhew that the plants ſtill exiſt in the ſame places; and we now ſubmit the fruits of our reſearches to the Linnean Society, flattering ourſelves with the hope that they may hereafter prove uſeful to ſome Botaniſt, whom chance or inclination may lead to the ſpots which we viſited.

Having premiſed this, it only remains for us to expreſs the ſenſe we feel of the kind attention we received from the cultivators of Natural Hiſtory in the places through which we paſſed, particularly to Richard Bryer, Eſq. of Weymouth, to the Rev. J. T. Thomſon, and William Penneck, Eſq. of Penzance, to Thomas Webb Dyer, and William Clayfield, Eſqrs. of Briſtol, and to Dr. Williams of Oxford; to all of whom we are happy to own ourſelves indebted, as well for repeated inſtances of civility, as for the trouble they took in pointing out to us the plants growing round their ſeveral towns.

Serapias latifolia—St. Vincent's Rock, near Briſtol.

Valeriana rubra—Walls of Glaſtonbury-Abbey, and Oxford. Sometimes with a white flower.

Iris fœtidiſſima—Hedges about Weymouth.

Eriophorum vaginatum—Marſh near Penzance.

Carex digitata—St. Vincent's Rock.

Rubia peregrina—Hedges near Exeter, Plymouth, Sidmouth, Dunſter, &c. &c.

Anchuſa ſempervirens—near Liſkeard and Barnſtaple.

Symphytum patens—Meadows between Lyme-Regis and Sidmouth.

Campanula hederacea—near Falmouth, Penzance, Camelford, &c.

——— *hybrida*—Cornfields near the ſite of Old Sarum.

Verbaſcum Lychnitis—near Taunton.

Viola lactea—Heaths between Liſkeard and Leſtwithiel.

Illecebrum verticillatum—Boggy ground near Penzance.

Herniaria glabra—Hedges at the Lizard Point.

Beta maritima—Cliffs at Weymouth, Falmouth, &c.

Daucus maritimus, With.—Rocks about Caſtle-Treryn.

Crithmum maritimum—common in Cornwall.

Heracleum Sphondylium β—Hedges near Holſworthy, Devonſhire.

Liguſticum cornubienſe—near Bodmin.

Oenanthe crocata—plentiful in Cornwall.

Pimpinella dioica—St. Vincent's Rock.

Tamarix gallica—St. Michael's Mount.

Linum uſitatiſſimum—Cliffs at Falmouth.

Scilla autumnalis—Clifton near Briſtol.

—— *verna*—Paſtures near the Lizard-Point and Land's-End.

Aſparagus officinalis—near the Ferry and extremity of Portland Iſland.

Vaccinium Myrtillus—Hedges about Liſkeard.

Erica vagans—abundant on the Downs between Helſton and the Lizard.

Chryſoſplenium oppoſitifolium—common in Cornwall.

Dianthus cæſius—Chedder Rocks—plentiful, but moſtly in inacceſſible places.

Silene amœna, Hudſ.—Sea-coaſt at Weymouth, and in Cornwall.

Sedum ſexangulare—Ruins of Old Sarum.
—— *anglicum*—common near the Sea in Cornwall and Devonſhire.
—— *daſyphyllum*—Walls near Briſtol.
—— *rupeſtre*—Chedder and St. Vincent's Rocks.
Euphorbia Paralias } —Portland-Iſland; we found the latter only
——— *portlandica* } near the remains of Bow-and-Arrow Caſtle.
Cratægus Aria—Chedder and St. Vincent's Rocks.
Aquilegia vulgaris—Hedges near Redruth.
Galeobdolon luteum—Wood between Bridport and Lyme-Regis.
Leonurus Cardiaca—Waſte ground near Briſtol.
Melittis grandiflora, Engl. Bot.—near Aſhburton and Liſkeard.
Bartſia viſcoſa—Marſhes about Penzance.
Sibthorpia europæa—Damp hedges and boggy ground near Leſtwithiel, Falmouth, Penzance, Camelford, &c.
Crambe maritima—Sidmouth Cliffs, in inacceſſible places.
Lepidium petræum—St. Vincent's Rock.
——— *didymum*—Rubbiſh at Penryn.
Thlaſpi arvenſe—Cornfields about Ayleſbury.
Cochlearia danica—Sea coaſt at Portland-Iſland, and in Cornwall.
——— *anglica*—Marſhes near Briſtol.
Arabis ſtricta—St. Vincent's Rock.
Turritis hirſuta—Ruins of Old Sarum.
Braſſica oleracea—King's-Cove near Marazion.
Geranium ſanguineum—near the Lizard-Point, and Briſtol.
——— *columbinum*—Hedges near Liſkeard, Taunton, Wells and Briſtol.
——— *maritimum*—about the Lizard-Point and St Michael's Mount.
——— *lucidum*—near Wells.
——— *rotundifolium*—Hedges near Plymouth and Briſtol.

Fumaria

Fumaria capreolata
——— *claviculata* —Walls and Hedges round Dunſter.

Lathyrus Aphaca
——— *ſylveſtris* —Cliffs near Sidmouth.

Vicia ſylvatica—Cliff at Ilfracombe.
——— *lutea* *—Glaſtonbury Tor Hill.
Hippocrepis comoſa—near Dorcheſter and Briſtol.

Trifolium maritimum
Lotus diffuſus —Marſhes below Cooke's Folly near Briſtol.

Hypericum Androſæmum—Hedges near Saltaſh.
Tragopogon porrifolium—Marſhes below Cooke's Folly near Briſtol.
Carduus eriophorus—Hedges near Wells.
Senecio ſqualidus—Walls near the Botanic Garden, Oxford.
Lycopodium Selago—a moiſt hill between Sidmouth and Exeter.
Oſmunda regalis—common in Cornwall.
Aſplenium Ceterach—Walls about Wells and Briſtol.
——— *marinum*—Rocks at the Lizard, Caſtle Treryn, &c.
Polypodium fragile—St. Vincent's Rock.
Fontinalis minor—Rivulet near Chedder Cliffs.
Bryum criſpum—common on trees in Cornwall.
Hypnum criſpum—Wood near Wells—in fruit on St. Vincent's Rock.
Lichen ſolithus—Stones at Maiden Caſtle near Dorcheſter.
——— *calcareus*—Limeſtone Rocks, Cornwall.
——— *ſtilularis*—Stone-Henge.
——— *geographicus*—Rocks at Tintagel, and the Valley of Stones near Linton, Devonſhire.
——— *rupicola*—Rocks near the Lizard.

* We gathered this in great plenty, but ſaw no appearance of *V. hybrida*. See *Engl. Bot.* 482.

Lichen

Lichen coccineus *—Stone-Henge.
——— *crenularius*—Rocks near the Lizard.
——— *tartareus*—Rocks near Redruth and the Land's End.
——— *byssinus*—Wall at Briſtol.
——— *obscurus*—Rocks about Penzance, the Lizard, &c—Stone-Henge.
——— *luridus*—Chedder Rocks.
——— *cartilagineus*—St. Vincent's and Chedder Rocks.
——— *muralis*—ſmall ſtones on Saliſbury Plain.
——— *centrifugus*—Rocks near Redruth.
——— *omphalodes*—near Penzance, Redruth, &c.
——— *globiferus*—Stones near Caſtle Karn Brè.
——— *fragilis*—Stones, St. Cleere near Liſkeard.
——— *paſchalis*—between Leſtwithiel and St. Auſtle.
——— *exilis*—Rocks at St. Cleere's near Liſkeard.
——— *articulatus*—Trees near Liſkeard.
——— *vulpinus*—Rocks and Trees about Caſtle Treryn, Liſkeard, &c.
——— *plicatus*—Trees near Bodmin.
——— *fuciformis*—Rocks near King Arthur's Caſtle at Tintagel.
——— *Endocarpon*—Chedder and St. Vincent's Rocks.
——— *pulmonarius*—Trees about Camelford, Launceſton, &c. We did not find it in fruit.
——— *ſcopulorum*—Rocks at the Land's End.
——— *glomuliferus*—Trees near Launceſton.
——— *caperatus*—abundantly in fruit on rocks near Penzance, and in a Wood near Camelford.

* From a careful examination of this *Lichen*, which I here found in great abundance, I was perſuaded of its ſpecific difference from the *L. hæmatomma* figured in *Engl. Bot.*—They hardly reſemble each other in any circumſtance except the colour of the ſhields. *D. T.*

Lichen

Lichen ſcrobiculatus }
——— *plumbeus* } —Trees near Bodmin and Liſkeard.

——— *miniatus*—Chedder, St. Vincent's and Tintagel Rocks.

——— *ſaccatus*—Chedder and St. Vincent's Rocks.

——— *perlatus*—We found this in fruit only in a wood between Camelford and Bodmin, and on a ſtone-fence near Ilfracombe.

——— *fuliginoſus*—plentiful upon trees and rocks about Launceſton, Bodmin, &c.

——— *Tremella*—Rocks in Devonſhire.

Fucus tamariſcifolius—Falmouth and St. Michael's Rock.

——— *fibroſus*—Falmouth and Ilfracombe.

——— *fæniculaceus*—Weymouth, Lyme-Regis and Falmouth.

——— *kaliformis*—abundant on the Weſtern Coaſt.

——— *eſculentus*—King's Cove (Cornwall) and St. Michael's Mount.

——— *ſanguineus*—Portland Iſland.

——— *alatus*—Weymouth.

——— *hypogloſſum*—Mount Edgecumbe.

——— *loreus*—Falmouth and Mount's Bay.

——— *bulboſus*—St. Michael's Mount.

——— *canaliculatus* }
——— *pygmæus* } —common on the Weſtern Coaſt.

——— *jubatus*—King's Cove and Ilfracombe.

——— *pinnatifidus* var. *oſmunda*—Weymouth.

——— *tomentoſus* }
——— *tuberculatus* } —King's Cove and Mount's Bay.

——— *aculeatus*—Portland Iſland and Kynance Cove near the Lizard.

——— *ovalis*—Portland Iſland, Falmouth and Mount's Bay.

——— *pinaſtroides*—Weymouth and Portland Iſland.

——— *ſubfuſcus*—Portland Iſland. We ſaw only one ſpecimen.

Fucus

Fucus corneus—King's Cove.

—— *cartilagineus*
—— *obtusus* } Weymouth.

Ulva purpurascens
—— *rubens* } Mount Edgecumbe and Falmouth.

Conferva gelatinosa—near Launceston.

Sphæria licheniformis—Stones on Glastonbury Tor Hill.

——— *nitida*—in a Wood between Camelford and Bodmin.

Lycoperdon equinum—near Maiden Castle near Dorchester, on a ram's horn.

XXV. *A new Arrangement of the Genus Narciſſus. By A. H. Haworth, Eſq. F.L.S.*

Read October 1, 1799.

THE genus *Narciſſus* is at once beautiful, fragrant, and (as a vernal one,) intereſting; but although it has been univerſally cultivated for more than a century, both in this country and on the Continent, it is ſtill comparatively but little underſtood; and yet the ſpecies are neither numerous nor deficient in characteriſtic diſtinctions.

I truſt, therefore, the following account of its component ſpecies, ſo far only as I grow them myſelf, will not be unacceptable to the Linnean Society. It has nothing to recommend it, but the novelty and ſimplicity of its diviſions, and characters eſtabliſhed by a ten years cultivation.

I poſſeſs ſeveral *Narciſſi* which I have not inſerted in this arrangement, not having had them long enough to diſcover characters ſufficiently permanent.

Nearly all the *Narciſſi* have bulbous roots of the tunicated kind, which are ſaid to grow ſpontaneouſly in the ſouthern parts of Europe, but more eſpecially in Spain. In England we have four. For brevity's ſake I ſhall give but one ſynonym to each deſcribed ſpecies, and that ſhall be the beſt: thoſe which are new ſhall be marked with an aſteriſk.

SYNOPSIS

SYNOPSIS SPECIERUM.

NARCISSUS.

* *Petalis nectarium æquantibus.*

† *Foliis filiformibus.*

tenuifolius. 1. N. nectario lobulato. *Park. Par.* 107. *f.* 7.
I firſt met with this ſpecies and the next in the Botanic Garden of J. Symmons, Eſq. Paddington.

* *inflatus.* 2. N. nectario apice ſubcontracto integro, ſtylo exſerto.

Bulbocodium. 3. N. nectario turgido integerrimo, ſtylo incluſo. *Curt. Bot. Mag.* 88.

†† *Foliis planis.*

minor. 4. N. nectario apice patulo. *Curt. Bot. Mag.* 6.

* *albus.* 5. N. nectario recto apice ſublobato.
I met with this in the Botanic Garden, Brompton, about three years ſince.

Pſeudo-narciſſus. 6. N. nectario apice criſpo crenulato. *Engl. Bot.* 17. a moſt excellent figure.

* *Sibthorpii.* 7. N. nectario ore patulo, tubo corollæ abbreviato.
I was informed I think by the late Mr. Curtis, from whom I had this plant, that the late Dr. Sibthorp found it wild in Oxfordſhire ſeveral years ſince; and it is probably the N. *Pſeudo-narciſſus* of the *Fl. Ox.*

bicolor. 8. N. nectario luteo, petalis albeſcentibus.
N. bicolor *Linn. Sp. Pl.* 415. excluſo ſynonimo *Bauh. Pin.* 52, et forte *Rud. elyſ.* 2. *p.* 71. *f.* 9. quæ non vidi.

major. 9. N. nectario ampliſſimo apice patentiſſimo inciſo undulato. *Curt. Bot. Mag.* 51.

** *Petalis nectario duplò majoribus.*
† *Floribus nutantibus.*

incomparabilis. 10. N. uniflorus, nectario plicato. *Curt. Bot. Mag.* 121.

* *elatior.* 11. N. ſubquadriflorus, nectario 6-lobulato.

odorus. 12. N. ſubtriflorus, nectario apice criſpo. *Curt. Bot. Mag.* 78.

orientalis. 13. N. ſubbiflorus, nectario inciſo. *Ait. Kew.* 1. 409.
This ſpecies might probably arrange better in the laſt ſection.

†† *Floribus cernuis.*

triandrus. 14. N. ſtylo ſtaminibuſque incluſis. *Curt. Bot. Mag.* 48.

*** *Petalis nectario triplò majoribus.*
† *Pauciflori.*

poeticus. 15. N. uniflorus, nectario rotato membranaceo crenato, petalis foliiſque ampliſſimis. *Engl. Bot.* 275, excellent.

anguſti-

anguſtifolius. 16. N. uniflorus, nectario breviſſimo crenulato, petalis foliiſque gracilibus. *Curt. Bot. Mag.* 193, excellent.

A very diſtinct ſpecies.

biflorus. 17. N. ſcapo ante floreſcentiam geniculato. *Curt. Bot. Mag.* 197, excellent.

tenuior. 18. N. ſubbiflorus, foliis lineari-ſubulatis. *Curt. Bot. Mag.* 379.

I have known this plant ſeveral years in the Brompton Botanic Garden, when it was cultivated under the name of *uniflorus*. I firſt propoſed the name *tenuior* to Mr. Curtis, obſerving at the ſame time that the difficulty of diſtinguiſhing it from *N. biflorus* was effectually removed by that term.

†† *Multiflori.*

Tazetta. 19. N. nectario apice contracto integerrimo. *Park. Par.* 81. 3.

crenulatus. 20. N. nectario apice patente crenulato. *Park. Par.* 81. 5.

* *tereticaulis.* 21. N. nectario apice patente, lobulato.

* *compreſſus.* 22. N. nectario expanſo crenato, foliis latis anguſtiſque, caule valde compreſſo, angulis obtuſiſſimis.

Jonquilla. 23. N. foliis ſemiteretibus. *Curt. Bot. Mag.* 15.

XXVI. *Some Obſervations upon Inſects that prey upon Timber, with a ſhort Hiſtory of the Cerambyx violaceus of Linnæus.*

By the Rev. William Kirby, F. L. S.

Read November 5th, 1799.

NO part of the economy of this terreſtrial globe is more worthy of admiration, or furniſhes a wider field for inquiry, than the methods by which all that vaſt variety of ſubſtances, animal and vegetable, which are produced from the earth, are kept within their proper bounds, and, when life is departed from them, are reduced to duſt; ſo that a due harmony of parts is preſerved, the relative proportion of individuals accurately adjuſted to the wants and general good of the ſyſtem; and thoſe ſubſtances which have a tendency to deform or injure it, are in due time removed out of the way, and made to contribute under another form to its ſupport.

Not to mention man, and the various ſpecies of quadrupeds, birds, fiſhes, reptiles and worms, which prey on animal and vegetable life; inſects, although very diminutive, are very powerful inſtruments, in the hands of the great Diſpoſer of events, to promote, ſometimes indeed by partial evil, the good of the whole. To them it is given in charge not only to prey on living ſubſtances, but alſo to haſten the diſſolution and decompoſition of thoſe that are dying or dead. Of theſe none ſeem to have a more arduous taſk aſſigned them, than thoſe whoſe office it is to bring on, or

accelerate the decay of the giant inhabitants of the foreſt. Numerous ſpecies of inſects, and in various ways, labour in this department (*a*). Some attack living trees, others thoſe that are dead. Some depoſit their eggs in them, that, when hatched, their larva may feed upon the wood; while others ſeek only a place well ſheltered from wet, cold, birds or other inſects, for the habitation of of their young. Again, ſome prey upon the ſoundeſt timber; while others make no attempt upon it till it begins to decay:—but all contribute, in one way or other, to the ſame end; one taking up the office, where another reſigns it; till that which from its bulk and ſolidity appeared calculated to laſt as long as the earth that gave it birth, by the ſucceſſive efforts of various kinds of inſects, is reduced in no very long time to its original duſt. So powerful are the effects produced by inſtruments which we too often overlook or deſpiſe.

To particularize ſome of the ſpecies employed in this work, and to point out what trees they attack either for food, or to ſecure a ſheltered ſituation for their offspring, may not be unentertaining, or altogether uſeleſs. I ſhall therefore mention a few of the individuals of each of the Linnæan claſſes, omitting *Hemiptera* and *Neuroptera*, of which I recollect no ſpecies that feed or nidificate in wood; reſerving the *Coleoptera*, which claſs ſends forth the moſt numerous bands of theſe minute pioneers of nature, to the laſt; and concluding the whole with a ſhort hiſtory of the *Cerambyx violaceus* of Linnæus.

Among the *Lepidopterous* inſects, the larva of the *Phalæna Bombyx*

(*a*) Inſects are not the only labourers employed in this field; the ſame end is promoted by the *Algæ* and *Fungi*. Witneſs the numerous tribe of *Lichens*, *Tremellæ*, *Agarici*, *Boleti*, *Auriculariæ*, *Sphæriæ*, &c. which derive their nouriſhment from decaying wood, and aſſiſt in its decompoſition.

Coſſus

Coſſus is known to attain its great ſize by feeding upon the willow, and other kinds of wood when in a decaying ſtate. The ſame tree affords nouriſhment, as we learn from Mr. Lewin *(a)*, to the *Sphinx crabroniformis*; as does the poplar to the *Sphinx apiformis (b)*, and *veſpiformis*. The inſects of the *Hymenoptera* claſs bring on the decay of ligneous ſubſtances in various ways. The neſts and cells of many of the genuine *Veſpæ* are made of a kind of paper formed of the filaments of wood. I have often been highly amuſed by ſeeing the common waſp, which, though a miſchievous, is at the ſame time a very ingenious animal, employed in ſcraping gate-poſts with her ſtrong maxillæ, to collect materials for this purpoſe; a ſight which Reaumur informs us it was long before he could enjoy *(c)*. The *Hornet* frequently perforates hollow trunks, to build her paper metropolis in a ſheltered ſituation *(d)*. The *Leaf-cutter* bees, of which there are ſeveral ſpecies all confounded under the common name of *A. centuncularis*, in order to place their *centunculi (e)* of curious conſtruction, in perfect ſecurity, make their way into the body of various trees. One ſpecies ſelects the willow for this purpoſe *(f)*, another the oak *(g)*, or the elm indifferently. *Apis*

(a) Linn. Tranſ. Vol. iii. p. 2. *(b)* Ibid. p. 1.

(c) Reaum. Tom. vi. Mem. vi. p. 180, 181.

(d) Ibid. Mem. vii. p. 217. I am informed by my friend Sir Thomas Cullum, whoſe ſpirit and accuracy of obſervation throw light upon every branch of Natural Hiſtory, that in the year 1785, in Mr. Porte's gardens at Ham near Dovedale, the hornets deſtroyed a great number of the young oaks by making their way into their heart, and there building their neſts.

(e) Ibid. Mem. iv. Tab. 9. fig. 8—18 i. Tab. 10. Reaumur's ſpecies makes its neſt under ground; but Geoffroy's (*Hiſt. ab. des Inſ.* Tom. ii. p. 410. n. 5.) and our Engliſh ones make theirs in the trunks of trees.

(f) Raii Hiſt. Inſ. p. 245. Sir E. King, in *Philoſ. Tranſ.* abridged by Lowthorp, Vol. ii. p. 773. Willoughby in Do. p. 773, 774. Dr. Martin Liſter in Do. 774.

(g) Apis centuncularis, Donovan Brit. Inſ. Vol. iv. Tab. 120.

maxillo/a

maxilloſa (a) nidificates in poſts and rails. *Apis violacea*, as we learn from Reaumur *(b)*, conſtructs curious cells for its young, of ſeveral ſtories, in the ſupports of eſpalier trees. *Apis furcata (c)* makes ſimilar cells in decaying wood. Many other inſects of this claſs, particularly *Spheges*, and illegitimate *Veſpæ*, emerge from cylindrical holes in trees and poſts, in which they were nouriſhed in their larva ſtate.

Of *Dipterous* inſects, the *Tipula pectinicornis*, ſingular for the branching antennæ of the male, and many other ſpecies of that genus, in their larva ſtate, inhabit putreſcent wood *(d)*: and a numerous army of the *Oniſcus Aſellus*, to name no other inſect in the *Aptera* claſs, is generally to be met with in thoſe parts of decaying trees under the bark, which are deſerted by other inſects; upon which, from its ſaw-duſt-like excrement, it appears to feed.

Having gone over the other claſſes, it remains that we mention the devourers of wood amongſt the *Coleoptera*. Foremoſt in the ranks comes the gigantic *Lucanus Cervus*, whoſe larva feeds upon the decaying wood of the oak *(e)* and the elm. In the latter is alſo found the *Lucanus inermis (f)*. The aſh affords nouriſhment both to *Lucanus parallelipipedus* and *L. cylindricus*. *(Scarabæus cylindricus* of Linn. but ſurely a true *Lucanus.)* The ſeveral ſpecies of the genus *Ips (Boſtrichus* Fab.) feed upon timber between the bark

(*a*) Marſham in *Linn. Tranſ.* Vol. iii. p. 27, 28.

(*b*) *Reaumur*, Tom. vi. Mem. ii. Tab. 5.

(*c*) *Furcata.* A. cinereo pubeſcens; atra; antennarum articulo primo, fronte, labioque flavis: abdomine apice furcato; tarſis ferrugineis. *Panzer. Fn. Inſ. Germ. Init.* No. lvi. Tab. 8. *Obſ.* Panzer's inſect is the male of this ſpecies.

(*d*) Habitat in carie arborum ſolitaria larva, pupaque. *Schrank. Enum. Inſ. Auſtr.* p. 423. n. 853. I have found the pupa in the ſame ſituation.

(*e*) In Europæ ligno quercino putrido. *Linn. Syſt. Nat.*

(*f*) Inermis. 2 L. ſcutellatus, convexus, brunneus, maxillis brevibus dente laterali elevato. Marſham M. S.

and the wood, upon the ſurface of which they uſually trace in feeding, what Linnæus calls pinnated labyrinths, in which a number of lateral lines, nearly parallel with each other, form right angles on each ſide, with a central one; and thus the bark is finally ſeparated from the wood. Moſt trees, I imagine, have a particular ſpecies of this genus aſſigned to them. Thus *Ips piniperdus* attacks the fir. *Ips Scolytus*, the elm. *Ips niger (a)*, *I. griſeus (b)*, *I. rufeſcens (c)*, and, I believe, *I. nebuloſus (d)*, undertake the barking of the aſh. *Ips fuſcus (e)*, and probably more ſpecies, feed upon the oak. Even ſhrubs do not eſcape, for whin or furze *(Ulex europæus)* is preyed upon by the minute *Ips rhododactylus (f)*, which I have frequently taken coming out of the larger ſticks of a dead whin-fence in my own garden. Next to theſe come the *Ptini*; ſeveral ſpecies of which are found in wood. I meet with *Ptinus teſſellatus* in the willow, and I believe it will attack deal or any ſoft wood. It is one of thoſe inſects that is called the death-watch, from a certain ſound which it makes at regular intervals reſembling the clicking of a watch, which, the vulgar ſuperſtitiouſly imagine, forebodes the death of ſome perſon in the houſe in which it is heard. The *Ptinus pectinicornis* alſo, and *Pt. cylindricus (g)*, feed in the ſame tree.

(a) Niger. 24. I. ſubcylindricus, niger, thorace punctulato, elytris crenato-ſtriatis, plantis piceis. Marſham M.S.

(b) Griſeus. 9. I. ferrugineus, capite nigro, ſupra ferrugineo teſtaceoque varius. Ibid.

(c) Rufeſcens. 10. I. ſubtùs luteus, ſuprà rufus, elytris luteo nebuloſis. Ibid.

(d) Nebuloſus. 8. I. ſubvilloſus, corpore nigro cinereoque vario. Ibid. *Boſtrichus Fraxini*: ater fuſco cinereoque varius, elytris punctato ſtriatis, antennis teſtaceis clavâ cinereâ acutâ. *Panz. Fn. Inſ. Germ.* Init. n. 66. tab. 13.

(e) Fuſcus. 5. I. fuſcus, antennis pedibuſque teſtaceis; elytris retuſis confertiùs punctulatis. Marſham M. S.

(f) Rhododactylus. 22. I. niger, villoſus totus, plantis rufis. Ibid.

(g) Cylindricus. 6. Pt. ſubcylindricus fuſco ferrugineus; thorace gibbo læviuſculo; antennis pedibuſque rufeſcentibus. Ibid.

But of all the ſpecies of this genus, *Ptinus pertinax* is the moſt miſchievous; any kind of wood that begins to have a tendency to decay, it attacks without mercy. I ſpeak this from experience, having a chamber in my houſe, the floor of which is quite filled and perforated in every direction by this deſtructive little inſect; and my walnut-tree chairs it has nearly reduced to the ſame ſtate that Linnæus obſerves it had done his (*a*).

Amongſt the *Curculiones*, the late ingenious Mr. Curtis has informed us, that *C. Lapathi* feeds upon the willow (*b*). *C. lignarius* (*c*) preys upon the trunk of putrid elms; and *C. atramentarius* (*d*) I have found in all its ſtates in old rails under bark. There is one inſect, which although not as yet diſcovered in England, ought not to be paſſed over, as its hiſtory furniſhes a ſtriking proof how uſeful the ſtudy of Natural Hiſtory may be made when applied to Œconomics: the inſect I allude to is the *Cantharis navalis* of Linnæus. Our preſident, the liberal poſſeſſor of the Linnæan treaſures, informs me, from the *Iter Weſtrogothicum*, that the oak timber in the royal dock-yards in Sweden being obſerved to have ſuffered conſiderable injury from ſome unknown animal, Linnæus was deſired by His Swediſh Majeſty to trace out the cauſe, and point out ſome remedy which might prevent the further progreſs of ſo alarming an evil. Upon inquiry he diſcovered that the miſchief was occaſioned by this *Cantharis*, and he recommended that the timber ſhould be immerſed in water during the uſual time of this inſect's

(*a*) Terebravit et deſtruxit ſedilia mea. *Linn. Syſt. Nat.*

(*b*) *Linn. Tranſ.* Vol. I. p. 86.

(*c*) *Lignarius.* 113. C. nigro-piceus totus, roſtro craſſiuſculo, thorace punctato, elytris abbreviatis. Marſham M.S.

(*d*) *Atramentarius.* 165. C. ater obovatus, thorace utrinque unidentato, elytris ſtriatis. Ibid.

appearance. This advice was purſued, and the dock-yard timber received no further injury.

We have ſo few ſpecies of the genus *Bupreſtis* in England, and thoſe that we have are ſo ſeldom met with, that it is no wonder if the habitation of their larvæ is not commonly known; both De Geer (*a*), and Geoffroy (*b*), however, are of opinion that they are inhabitants of wood. But the timber-merchant and the builder have no greater enemies than the genuine *Cerambyces*, under which genus I would, with De Geer (*c*), include thoſe only which have reniform or lunar eyes, excluding *C. Curſor*, *Lamed*, *meridianus*, *Inquiſitor*, &c. and taking in *Leptura Alni*, *arcuata*, *arietis*, *myſtica*, *præuſta*, &c. of Linn. Theſe inſects, as far at leaſt as we are acquainted with them, not only devour the ſurface of the wood that lies under the bark, but penetrate deep and in all directions into the ſolid timber. What havock muſt the larva of ſo large an inſect as *Cerambyx coriarius* make in an oak tree (*d*)! I have taken the pupa of *Cerambyx arcuatus* out of the heart of a ſolid piece of the ſame timber, which had been perforated by that inſect in all directions. Once in the height of ſummer, when the mid-day ſun ſhone out warm, I was very much entertained with ſeeing ſeveral of theſe fine inſects fly down upon a pollard oak that had been felled and the bark left upon it, and run all over it with great velocity, ſeeking, it is probable, a place proper for depoſiting their eggs.

Amongſt the *Cerambyces* of this country, the ingenious Mr. Donovan, in his elegant work upon Britiſh Inſects (*e*), has figured *C. violaceus*,

(*a*) *De Geer*, Tom. iv. p. 131.
(*b*) *Geoffr.* Tom. i. Cucujus. n. 1. p. 125. n. 2. p. 126.
(*c*) *De Geer*, Tom. v. p. 55, 56.
(*d*) Habitat in betulis putridis. *Linn. Syſt. Nat.* But I have known it cut out of an oak.
(*e*) *Donov. Brit. Inſ.* Vol. ii. p. 73. Tab. 61. fig. 1.

laceus, and informs us that it probably feeds upon the fir, but at the ſame time expreſſes a ſtrong ſuſpicion that this beautiful inſect is not originally Engliſh. How far this may be true, it is not my intention to inquire; I ſhall only obſerve, that it is now become but too common, at leaſt in one ſpot, in the neighbourhood of London, as will appear from thoſe circumſtances of its hiſtory which I am going to relate.

My friend and relation Mr. James Trimmer of Old Brentford (*a*), an attentive obſerver of nature, more particularly of the economy and habits of inſects, and to whom I am indebted for much curious and intereſting information in this branch of ſcience, ſome time ago wrote to inform me, that he had found this inſect in its three ſtates in fir-timber, and accompanied this intelligence with many ingenious remarks. Expecting him ſoon to viſit me at Barham, in my anſwer I requeſted him to bring with him ſome of its *larvæ* and *pupæ*, and alſo ſome pieces of the wood upon which they had been feeding; at the ſame time I deſired him to continue obſerving their motions. What follows relative to the hiſtory of this *Cerambyx* is chiefly compiled from his communications, which I thought too intereſting to be loſt.

The fir in which Mr. Trimmer firſt found this inſect was of Engliſh growth, of the ſpruce kind, which had not been felled many years, and had originally grown near the ſpot on which the building was erected in which it was employed: it did not appear to have been attacked more than two years when Mr. Trimmer made his obſervations; and it ſuffered moſt in 1798, when the *larvæ* had multiplied ſo much, and been ſo extremely voracious as to have left very little food for another year. Some Scotch fir in an

(*a*) Son of Mrs. Trimmer, ſo juſtly celebrated for her humane and ſucceſsful exertions to procure the great bleſſing of a religious education for the children of the poor.

adjacent

adjacent building had alſo been attacked by them. Nor does this inſect ſo entirely confine itſelf to fir, as never to attack any other kind of wood; for, when the *imago* firſt came forth in conſiderable quantities, Mr. Trimmer took ſeveral and placed them upon ſome pieces of fir which were under cover: but, what ſeems remarkable, the inſects quitted theſe, and went and depoſited their eggs in ſome pieces of apple, pear, cherry and plum, which had been ſelected for turning, and were piled up in the open air.

It is worthy of obſervation, that this deſtructive little animal attacks only ſuch timber as has not been ſtripped of its bark; a circumſtance which ought to be known and attended to by all perſons who have any concern with this article; for the bark is a temptation, not only to the inſect in queſtion, but alſo to a numerous tribe both of this and other genera; and a great deal of the injury which is done to timber would be prevented, if other trees beſides the oak were barked as ſoon as they are felled. The principal danger, however, ariſes from neglecting this precaution with reſpect to ſuch timber as is uſed in buildings, eſpecially in thoſe places that are acceſſible to inſects, for in this caſe it will not laſt out half its time.

But, to proceed with our hiſtory, the female of this inſect is furniſhed with a flat, retractile tube, or rather aculeus (*a*), which ſhe inſerts, it ſhould ſeem, (for Mr. Trimmer was never ſo fortunate as to ſee this operation performed,) between the bark and the wood to the depth of about a quarter of an inch, and there ſhe depoſits her egg, ſince not more than one appears to be laid in one place. By ſtripping off the bark it is eaſy to trace the whole progreſs of the *larva*, from the ſpot where it was newly hatched, to that where it has attained its full ſize (*b*). At firſt it proceeds onwards,

(*a*) Tab. 12. fig. 15. c. (*b*) Fig. 13. a—c.

but

but in a ſerpentine direction, filling the ſpace which it leaves behind it with its excrement, reſembling ſaw-duſt, and ſo ſtopping all ingreſs to enemies from without; but when it has arrived at its utmoſt dimenſions, it does not confine itſelf to one direction, but works in a kind of labyrinth, eating backwards and forwards, which gives the wood under the bark a very irregular ſurface (*a*); by this mean its paths are of conſiderable width. Its attacks are not confined to the ſolid timber, but in its progreſs it eats away an equal portion of the bark. The bed of thoſe paths where it has been at work, exhibits, when cloſely examined, a curious appearance, occaſioned by the eroſions of its maxillæ, which excavate an infinity of little ramified channels. When the inſect is about to aſſume the *pupa*, it bores down obliquely into the ſolid wood, to the depth ſometimes of three inches, ſeldom if ever leſs than two. Theſe holes (*b*) are nearly ſemicylindrical, expreſſing exactly the form of the grub. One would wonder how ſo ſmall and ſeemingly ſo weak an animal could have ſtrength to excavate ſo deep a mine: but when we ſee its maxillæ, our wonder ceaſes; theſe are large, thick, and ſolid ſections of a cone divided longitudinally (*c*), which in the act of maſtication apply to each other the whole of their interior plane ſurface, ſo that they grind the food of the inſect like a pair of millſtones. Early in March all the *larvæ*, except ſome ſickly ones, were obſerved to have entered the wood in this manner; ſome began ſo ſoon as October. At the place in the bark oppoſite to this hole, the *imago* gnaws its way out of its priſon when it makes its appearance, which took place firſt on the 20th of May, and continued till about the 20th of June; it returns by the ſame paſſage which the *larva* had excavated previous to aſſuming the *pupa*.

(*a*) Tab. 12. fig. 14. (*b*) Fig. 14, a a a. (*c*) Fig. 5. b b. Fig. 7. b.

Mr.

Mr. Trimmer thinks that theſe inſects fly only during the night, as in the day-time he always found them ſtanding upon the piece of wood from which they had been diſcloſed. The caſe is different with *Cerambyx arcuatus*, which, as I obſerved before, flies at mid-day: but perhaps this circumſtance may depend much upon the ſtate of the atmoſphere, or the hour of the day; for many inſects have their certain hours for flying; a ſingular inſtance of which I had once an opportunity of witneſſing. In the beginning of July 1793, about ten o'clock in the morning, as I was paſſing through a meadow, I was ſurpriſed with the appearance of what at firſt ſeemed to me to be myriads of bees flying about the hedges and trees; but, upon taking ſome of them, they proved to be *Scarabæus argenteus* (*Melolontha argentea* Fab.); upon my return through the ſame field, a little after noon, I was aſtoniſhed to find that of this infinite hoſt of inſects not a ſingle one was to be ſeen.

I have now communicated all the obſervations which Mr. Trimmer made with reſpect to the hiſtory of this inſect; theſe I hope will not be thought unworthy of the attention of the Linnean Society, ſince they furniſh an uſeful leſſon in Œconomics, and ſupply an additional proof of the utility of the ſtudy of Natural Hiſtory, and to what good purpoſes it may be directed.

Mr. Trimmer, when he came to Barham, brought with him ſpecimens of this inſect in all its ſtates, as alſo ſome pieces of the wood that had been attacked by it, from which I employed my ingenious friend the Rev. Peter Lathbury, F. L. S. to make the drawings which accompany this paper. Nothing now remains but to cloſe this account with a deſcription of each ſtate of the inſect.

CERAMBYX

CERAMBYX.

*****

Thorace inermi ſubrotundo, ſ. ex globoſo depreſſo.

violaceus. 70. C. thorace mutico ſubrotundo pubeſcente, corpore violaceo, antennis mediocribus. *Linn. Syſt. Nat. ed.* 12. *p.* 635. *n.* 70. *Fn. Suec. ed.* 2. *n.* 667. *Vill. Ent. Eur. tom.* 1. *p.* 247. *n.* 71. *Schrank. Enum. Inſ. Auſtr. p.* 147. *n.* 277. *Poda Muſ. Græc. p.* 36. *Fn. Frid. n.* 130.

C. violaceus nitens; corpore, thoraceque mutico ſubrotundo, depreſſis; femoribus clavatis, antennis mediocribus nigris. *De Geer. tom.* 5. *p.* 88. *n.* 24.

C. thorace ſubpubeſcente corpore violaceo antennis brevibus. *Lin. Syſt. Nat. Ed. Gmel. p.* 1848. *n.* 70.

Callidium violaceum. *Fab. Ent. Syſt. Em. tom.* 1. *par.* 2. *p.* 320. *n.* 9.

Cantharis nigra thorace rotundato, elytris cæruleſcentibus. *Gadd. Diſſ.* 28.

Stenocorus violaceus. *Scop. Ann. Hiſt. Nat. V. p.* 97. 59.

FIGURÆ. *Friſch. Inſ.* 12. *tab.* 3. *icon.* 6. *fig.* 1.
Schæff. Ic. tab. 4. *fig.* 13.
Oliv. Inſ. 70. *tab.* 7. *fig.* 77.
Herbſt. Arch. tab. 26. *fig.* 10.
Ræmer. Gen. Inſect. p. 9. *tab. front. fig.* 2.
Donovan. Brit. Inſ. vol. 2. *p.* 73. *tab.* 61. *fig.* 1.

LONG. CORP. a lin. $4\frac{2}{3}$ ad lin. $7\frac{1}{2}$.

DESCRIP. *Larva* (*a*) apoda, pallida, plicata, ſubpiloſa, ſupra convexa, ſubtùs planiuſcula, caput versùs incraſſata, ſegmentorum tredecim. *Caput* (*b*) magnum convexum, antennulâ (*c*) triarticulatâ, piloſulâ, utrinque inſtructum. *Os* rufeſcens, labio (*d*) apice rotundato ciliato ſupernè clauſum: labio inferiori (*e*) trifido, lobis lateralibus palpo unico (*f*), intermedio duobus (*g*), inſtructis. *Maxillæ* (*b*) horizontales, fuſcæ, ſemiconicæ, validiſſimæ, per totam ſuperficiem planam interiorem conniventes.

Pupa (*i*) incompleta, oblonga, pallida; omnes imaginis partes, membranâ tenuiſſimâ tectas, exhibens.

Imago (*k*). *Corpus* piceo-nigrum ſubpiloſum; ſupra violaceum, excavato-punctatum, punctulis creberrimis confluentibus. *Caput* magis exſertum quam in reliquis genuinis Cerambycibus noſtratibus. *Maxillæ* arcuatæ apice conniventes. *Palpi* quatuor capitati, clavâ compreſsâ truncatâ, exterioribus longioribus. *Antennæ* ſubſetaceæ, corpore ſubbreviores, atro-violaceæ piloſulæ, articulis ultimis ſubtomentoſis nigris. *Oculi* lunares baſin antennarum ponè amplexantes. *Gula* nitida. *Thorax* ex globoſo depreſſus, latior quam longus, ſ. lateribus gibbis. *Sternum* violaceum, mucrone brevi inſtructum. *Scutellum* medio depreſſum. *Elytra* linearia vix marginata, e violaceo nitentia ac velut aurata, apice rotundata humeris gibbis. *Alæ* fuſceſcentes; nervis,

(*a*) Tab. 12. fig. 4. (*b*) Fig. 5, b. (*c*) Fig. 5, a a; and fig. 8, b.
(*d*) Fig. 7, a; and fig. 12. (*e*) Fig. 9. (*f*) Fig. 10. h.
(*g*) Fig. 11, a a. (*b*) Fig. 5, b b; fig. 7, b; fig. 8, c.
(*i*) Fig. 2, 3. (*k*) Fig. 1.

margineque

margineque craſſiori, nigris. *Abdomen* ſupra planiuſculum, ſubtùs convexum. *Pedes* atri, interdum atro-violacei, femoribus clavatis apophyſi biarticulatâ inſidentibus: tarſi nigri quadriarticulati, unguibus rufeſcentibus.

Variat capite thoraceque vireſcentibus, aliquando ſupra totus vireſcens.

EXPLANATION OF TAB. XII.

FIG. 1. *Imago* of *Cerambyx violaceus*, natural ſize.
2. *Pupa* of ditto, the upper-ſide.
3. —— ditto, the under-ſide, to ſhew the mode in which the antennæ are folded.
4. *Larva* of ditto, a ſmall ſpecimen, and rather ſhrunk for want of food.
5. —— upper ſide of the head magnified. (a a) Its antennulæ. (b b) Its maxillæ.
6. —— the under ſide of the head.
7. —— a portion of the head greatly magnified. (a) The upper lip. (b) Maxilla.
8. —— a longitudinal ſection much magnified, to ſhew the folds of the abdomen more diſtinctly. (a) The head. (b) The antennula. (c) The maxilla.
9. —— under-ſide of the head much magnified, to ſhew the under lip. (a a) Its lateral lobes. (b b) Their feeler. (c) The intermediate lobe. (d d) Its feelers.
10. —— one of the lateral lobes of the under lip exhibited ſeparately, much magnified. (a) Its ſummit rounded and fringed with hair. (b) Its feeler.

FIG. 11. *Larva*—the intermediate lobe of the under lip. (a a) Its feelers.

12. ——— the upper lip much magnified. (a) Its ſummit round and fringed.

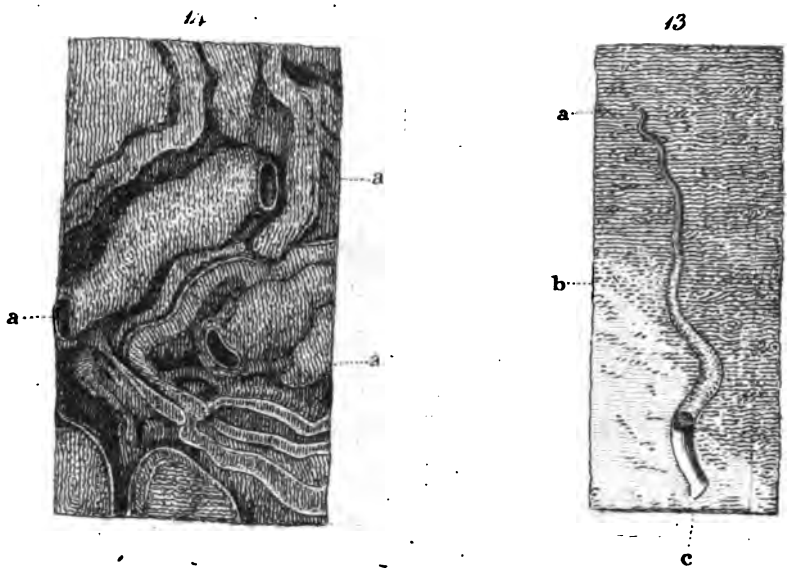
13. A portion of the wood with the bark taken off, to ſhow the progreſs of the larva from its being firſt hatched till it begins to work in all directions. (a-c) The ſerpentine path of the inſect. (a) The point where the egg was hatched. (b) The excrement of the inſect preventing all acceſs to it.

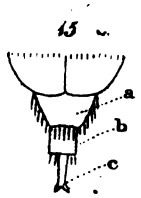
14. A portion of wood of irregular ſurface, upon which the larvæ have been long at work. (a a a) Semicylindrical holes where it has bored down into the ſolid wood.—A ſpecimen of this ſent to the Society.

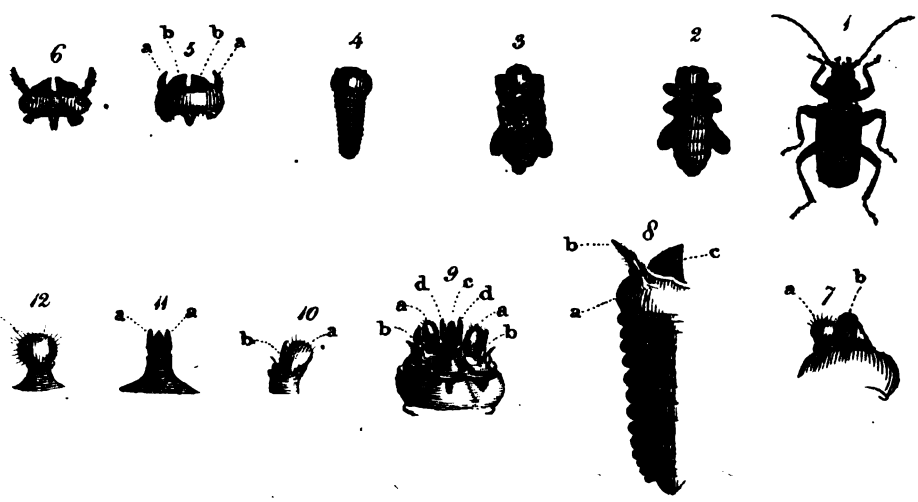
15. Anus of a female, to ſhew the inſtrument by which ſhe is enabled to introduce her eggs between the bark and the wood. (a) The anal ſegment of the abdomen. (b) A flat vagina, into which I ſuppoſe the aculeus is withdrawn when unemployed, and which itſelf is retractile within the anal ſegment. (c) The aculeus flat and bifid at its apex.

XXVII. *De-*

Linn Trans V. tab 12. p 260.







XXVII. *Deſcription of the Veſpertilio plicatus. By Francis Buchannan, M. D. A. L. S.*

Read November 5, 1799.

VESPERTILIO PLICATUS.

Section F of Ker's Tranſlation of Gmelin's Syſt. Nat.

Tailed; the noſtrils round, ſimple perforations: the upper lip very large, and folded: the ears as large as the head, folded, and half pendulous.

Inhabits old houſes at Puttahaut in Bengal.

FROM its teeth this bat can only be miſtaken for the *Cephalotes:* but the deſcription of that ſpecies will not apply to this.

From the point of the noſe to the root of the tail 3 inches: from the extremity of one wing to that of the other 12 inches.

The *wings*, and naked parts of the body, are ſoot-coloured. The hair is mixed with aſh-colour, and is paler below than on the back.

The *head* is large, thick at the ſhoulders, and tapers gradually to the *ſnout*; which is blunt, terminates in a heart-ſhaped margin, and projects far beyond the lower jaw. It is moſtly naked; but has ſeveral long, erect briſtles. The *noſtrils* are ſmall circular holes, remote from each other, and placed under the margin of the ſnout.

The *upper lip* at the ſides hangs over the under jaw, and at each ſide is deeply wrinkled with ſeven or eight vertical folds. The *ears* are large, blunt, wrinkled, and ſomewhat pendulous. From being bent in ſeveral folds, they at firſt ſight appear to be thick and fleſhy. They approach very near at their inſertion on the brow, and are naked, except on a ſharp ſinus towards the hinder part of the head. On their edge near the tips are five or ſix ſmall warts. There are no internal auricles. The *eyes* are in two ſmall ſlits above the angles of the mouth, and are almoſt covered by the ears. There are two ſtrong *tuſks* in each jaw. In the upper jaw there are two conical ſharp *fore-teeth*, half as long as the tuſks. Below, in place of theſe, there are only two ſmall points, ſcarcely projecting from the gums. The *grinders* are a little removed from the tuſks, and are in each ſide of each jaw five or ſix in number. In the lower jaw each grinder has two ſharp points; in the upper jaw each, except the firſt pair, has three points.

The *neck* is very ſhort, and ſo covered with hair as to be ſcarcely obſervable. The *ſhoulders* are high, and round, with a deep cavity between them. The *body*, at the ſhoulders, is much wider than at the haunches. The *buttocks* are bare.

The *tail* is naked, round, and blunt: it is turned up at the end. A ſtrong hooked *claw* in place of the thumb. No carpus nor metacarpus. Four long *fingers* ſerve to diſtend the membrane of the wing. The *hind-feet* have five diſtinct toes, with ſmall ſharp claws. The *membrane* of the *wings* joins the hinder legs and tail, but it is not nearly ſo long as the latter. A broad *hairy liſt* ſurrounds all round the body, and covers the bottom of the membrane.

The drawing and deſcription was taken from a male. I could obſerve no nipples.

The

Linn. Trans. V. tab. 13. p. 262.

The natives of Bengal have only two names for all the ſpecies of bats found in their country. The large bats, which neſtle on trees, and live chiefly on fruit, they call Bādŭr: thoſe which, like the one above deſcribed, inhabit caverns and old buildings, and live chiefly on inſects, they call Chamchēēka.

TAB. XIII. repreſents the *Veſpertilio plicatus* of its natural ſize.

XXVIII. *Descriptions of five new British Species of Carex. By James Edward Smith, M.D. F.R.S. P.L.S.*

Read December 3, 1799.

AFTER so copious a harvest of British Carices as that with which my learned friend Dr. Goodenough has enriched the second and third volumes of our Transactions, no great acquisitions of the same kind are to be expected. The gleanings only of this ample and well-cultivated field, so lately an impenetrable wilderness, have fallen to my lot; and though but about the tithe of the crop, I have spared no pains to collect and methodize them. The value of such discoveries increases in proportion to what we have already obtained; and I am very well aware how much I am indebted, for their perspicuity and certainty, to the clue my predecessor had left me.

In labouring at the genus *Carex* for the Flora Britannica, I have, as in every other instance, examined the subject throughout, without taking any thing for granted; but in no tribe of equal intricacy have I found so little at present to correct. What I am now about to offer is chiefly the description of 5 species, in addition to the 47 described by Dr. Goodenough. For the discovery of these I am entirely obliged to the friends whose names will hereafter appear. I have only to answer for the specific determination of 4 of them. Of the preceding 47 species the *Carex axillaris* only has not come so completely under my examination as I could have wished, though

though I have found no reaſon to doubt its being ſufficiently different from all others. *C. fulva* appears, notwithſtanding Dr. Goodenough's correction, *Tranſ. of Linn. Soc. v.* 3. 77, to be very diſtinct from *flava*, having longer vaginæ (which however are ſhorter than the flower-ſtalks), oval ſpikes, the fruits erect, not recurved, and a rough ſtem. Its habit too differs, approaching towards that of *C. diſtans*; but its glumes being perfectly awnleſs, keep it from being confounded with any variety of the laſt-mentioned. In my arrangement of the ſpecies I have taken the liberty of making ſome alterations, diſpoſing them according to their natural affinities, rather than their technical characters. In the generic character I have adopted an alteration lately ſuggeſted to me by Dr. Goodenough himſelf, calling the permanent huſk that inveſts the ſeed an *arillus*, a name which I cannot help thinking expreſſes its true nature much better than the hypothetical one of *nectarium*, the erroneous one of *capſula*, or even the analogical denomination of *corolla*. The generic character will therefore ſtand as follows:

Maſc. *Amentum* imbricatum. *Cal.* gluma univalvis. *Cor.* nulla.

Fœm. *Ament.* imbricatum. *Cal.* gluma univalvis. *Cor.* nulla. *Stigmata* 2 vel 3. *Semen* arillo ventricoſo tectum.

My new ſpecies belong to the firſt, third, and fourth ſections of the genus.

* *Spicâ unicâ ſimplici.*

1. CAREX *Davalliana.*

Prickly ſeparate-headed Carex.

C. ſpicâ ſimplici dioicâ, fructibus lanceolato-triquetris nervoſis patenti-deflexis: angulis apice ſcabris.

Carex dioica. *Wilden. Car. Berol.* 16, ex deſcr.

C. n. 1350. *Hall. Hiſt. v.* 2. 182.

Gramen cyperoides, ſpicâ ſimplici caſſâ. *Scheuchz. Agr.* 497. *t.* 11, *f.* 9, 10; ſynonymis omninò erroneis.

In uliginoſis. Fl. Maio, Junio.

Diſcovered in marſhy ground in Mearns-ſhire, North Britain, by Profeſſor James Beattie jun. of Aberdeen.

Radix fibroſa, cæſpitoſa. *Culmi* ſimpliciſſimi, triquetri, ſcabriuſculi, quandoque ſcaberrimi, monoſtachyi, baſi folioſi, parùm altiores quam in C. dioicâ verâ. *Folia* ſetacea, triquetra, culmo triplò breviora. *Spicæ* dioicæ, lineares, erectæ, multifloræ, vix unciales, glumis fuſcis, carinatis, acutis, margine ſcarioſis. *Stamina* capillaria, exſerta, antheris flavis, linearibus. *Fructus* lanceolato-triquetri, nec gibbi, roſtrati, undique nervoſi, angulis apice ſcabris, ore ſcarioſo, integro, demùm deflexo-patentes, acuminati, unde ſpicæ ſeminiferæ ſquarroſæ fiunt.

Specimens of this Carex were ſent to me from Switzerland, as well as to Dr. Goodenough, (ſee his poſtſcript at the end of our 2d volume,) by my much lamented friend the late Mr. Davall, who

diſcovered it to be different from the Linnæan *dioica*, to which the ſynonym of Scheuchzer is referred in the *Species Plantarum*. Linnæus, however, has eraſed this quotation from his own copy of that work. Mr. Davall has aſſured me this plant is very common in almoſt every damp ſpot about Orbe; whereas he had met with the *dioica* only in one peat bog. I have no doubt of its being what Haller intended under his n. 1350; it agrees exactly with his deſcription, though he has confounded under it ſynonyms of *dioica* and *pulicaris* at leaſt, if of no more ſpecies. It appears to be the *dioica* deſcribed by Profeſſor Wildenow in his recent treatiſe on the Carices found about Berlin, printed in the Tranſactions of the Academy of that place. Scheuchzer erroneouſly applied to it ſynonyms of Ray which belong to *C. pulicaris*, and has by that means been the cauſe of ſubſequent miſtakes. Mr. Davall having firſt elucidated the ſubject, I have conſecrated the ſpecific name to his memory.

No one had ſuſpected this to be a Britiſh plant till I received a ſpecimen this autumn from Profeſſor Beattie of Aberdeen, under the name of *dioica*, along with a rich aſſemblage of great part of the whole genus.

C. Davalliana is readily and eſſentially diſtinguiſhed from *C. dioica* by the fruit being of a triangular-lanceolate, not ovate, form, reflexed, not erect, and alſo much more ſtrongly nerved. No one who has examined both can ever confound them. *C. pulicaris* is diſtinguiſhed by being always androgynous, and having fruit altogether without nerves, lanceolate, and pointed at each end.

**** Spicis sexu distinctis: masculâ unicâ, rariùs geminâ: bracteis foliaceis et plerumque vaginantibus.*

2. CAREX *binervis.*

Green-ribbed Carex.

C. vaginis elongatis pedunculo brevioribus, spicis cylindricis remotis subcompositis, glumis mucronulatis, fructibus binervibus.

Carex distans. *Lightf.* 561, ex descr.

In ericetis siccioribus. Fl. Junio.

Very common on the driest moors about Aberdeen. *Prof. Beattie.* Near Edinburgh. *Mr. J. Mackay.*

Radix fibrosa. *Culmus* erectus, firmus, sesquipedalis, bipedalis, vel tripedalis, obtusè triqueter, lævis, apicem versùs hinc scaber. *Folia* erecta, latiuscula, acuminata, glaucescentia, marginibus carinâque aspera. *Bracteæ* foliis simillimæ, elongatæ, erectæ, longiùs vaginatæ, remotæ. *Spica* mascula utrinque attenuata, sæpè sesquiuncialis, multiflora, glumis densissimè imbricatis, ellipticis, obtusis, submucronulatis, nigricantibus, carinâ acutâ, virenti; fœmineæ tres aut quatuor, rarissimè quinque, sparsæ, cylindricæ, erectæ, inferiores remotissimæ, longiùs pedunculatæ, atque sæpiùs basi compositæ seu ramosæ, quandoque omnes supernè masculæ. *Glumæ* fœminearum ovatæ, nigræ, mucronulatæ, carinâ virenti, glabrâ, mucronulo scabro. *Fructus* glumis longiores, ovati, vix rostrati, glabri, nitidi; intùs apiceque sanguineo-fusci; extùs pallidi, nervis duobus lateralibus viridibus præcipuè conspicuis. *Semen* acutè triquetrum, albidum.

This

This ſpecies appears to have been confounded with *C. diſtans*; and from Lightfoot's deſcription of the green angles of the fruit, I preſume it to have been what he intended under that name. It is conſiderably larger than the real *diſtans*, the ſpikes black intermixed with green rather than yellowiſh, and the female ones often branched or compounded at their baſe. Its moſt eſſential and deciſive character however conſiſts in the two ſtrong deep-green nerves or ribs which run along each ſide of the fruit externally near the edge. The arillus is alſo broader and more compreſſed than in *C. diſtans*.

3. CAREX *tomentoſa*.

Downy-fruited Carex.

C. vaginis breviſſimis, ſpicis fœmineis ſubſeſſilibus cylindraceis obtuſis, glumis ellipticis acutis, fructibus tomentoſis.

Carex tomentoſa. *Linn. Mant.* 123. *Leers.* 200. *t.* 15. *f.* 7. *Wilden. Car. Berol.* 24. *Dickſ. Dr. Pl.* 43.

In pratis rariùs. Fl. Junio.

In meadows near Merſton Meaſey, Wiltſhire. *Mr. Teeſdale.*

Radix repens. *Culmus* pedalis, erectus, nudus, acutè triqueter, angulis ſupernè ſcabris. *Folia* culmo breviora, erecta, plana, lætè viridia, utrinque margineque ſcabra. *Bracteæ* foliaceæ, erecto-patentes, culmum vix ſuperantes, vaginâ breviſſimâ, aut ferè nullâ. *Spica* maſcula lanceolata, obtuſiuſcula, glumis lanceolatis, ferrugineo-fuſcis, carinâ virenti, ſuperioribus quandoque mucronulatis; fœmineæ plerumque duæ, parùm remotæ, breviſſimè pedunculatæ, cylindraceæ, obtuſæ, longitudine variæ, glumis elliptico-ovatis, vix

vix mucronulatis, ferrugineo-fuſcis, carinâ latè virenti. *Fructus* longitudine circitèr glumarum, densè imbricati, ſubrotundi, parùm compreſſi, vix triquetri, virides, tomento denſiſſimo, brevi, albido, demùm aureo, undique veſtiti. *Semen* albidum, obſoletè triquetrum.

Dr. Goodenough has ſhown that the *C. tomentoſa* of Lightfoot and Hudſon is the *filiformis* of Linnæus. I have now the pleaſure of giving the real *tomentoſa* a place in the *Flora Britannica*, on the authority of wild ſpecimens gathered in Wiltſhire laſt ſummer, by my friend Mr. Teeſdale, F. L. S. Thoſe in Mr. Dickſon's *Dried Plants*, *n.* 43, were all ſent from Switzerland. It is moſt akin to *præcox* and *pilulifera*, (both which have the fruit in ſome degree pubeſcent,) but is a much larger ſpecies, and if the ſpecific character be attended to, cannot be confounded with any other. The red *vaginæ* of the radical leaves, as in *C. digitata*, are very ſtriking at firſt ſight.

**** *Spicis ſexu diſtinctis: maſculis pluribus.*

4. CAREX *Micheliana.*

Blunt-fruited Black Carex.

C. ſpicis erectis cylindricis: fœmineis pedunculatis, glumis omnibus obtuſis muticis, fructibus obovatis obtuſiſſimis.

Cyperoides foliis caryophylleis, caule exquiſitè triangulari, ſpicis habitioribus, ſquamis curtis obtusè mucronatis, capſulis turbinatis brevibus confertis. *Mich. Gen.* 62. *t.* 32. *f.* 12.

In aquoſis. Fl. Maio?
Near Aberdeen. *Prof. Beattie.*

Culmus

Culmus erectus, pedalis aut ſeſquipedalis, triqueter, ſtriatus, vix ſcaber. *Folia* erecta, acuminata, marginibus aſpera, carinâ leviuſculâ. *Bracteæ* foliaceæ, erectæ, culmum ſuperantes, haud vaginatæ, baſi auriculatæ, auriculis magnis, rotundatis, connatis, fuſcis, apice pallidis. *Spicæ* cylindricæ, obtuſiuſculæ, erectæ; maſculæ tres aut quatuor, ſubſeſſiles, graciles, glumis obtuſiſſimis, muticis, glauco-fuſcis, margine tenui, ſcarioſo, niveo; fœmineæ duæ, longiùs pedunculatæ, craſſiores, ſuperior apice maſcula, inferior baſi interdùm compoſita, glumis ellipticis, obtuſiſſimis, muticis, fuſcis, margine ſcarioſo, albo, carinâ flaveſcente, obtuſâ. *Stigmata* tria. *Fructus* glumis multò breviores, obovato-triquetri, dilatati, ferè enerves, glabri, vireſcentes, apice obtuſiſſimi, indiviſi. *Semen* triquetrum, breve, fuſcum, angulis pallidis.

I cannot but confeſs that it was with extraordinary pleaſure I detected a ſpecimen of this Carex among many ſuppoſed varieties of *recurva* communicated by Profeſſor Beattie; for I immediately perceived its ſtriking agreement with that long-doubtful figure of Micheli, *tab.* 32. *f.* 12, which has been ſometimes referred to *acuta*, ſometimes to *ſtricta*, and hitherto found to agree well with no known ſpecies. As I believe no one but Micheli has deſcribed or diſtinguiſhed this plant, I have given it his name. His definition above-quoted will be found preciſely to accord with it, and I truſt my ſpecific character and deſcription will prevent its being miſtaken in future. It is moſt allied to *C. recurva*, (which ſometimes varies with numerous male ſpikes,) but the perfectly ſmooth fruit, ſhorter than the glumes, and rather compreſſed, by no means gibbous, clearly diſtinguiſhes *C. Micheliana*; not to mention its greater ſize, and erect female ſpikes, the lowermoſt of which is liable to be branched at the baſe, as in *C. binervis*.

5. CAREX

5. CAREX *lævigata.*

Smooth-ſtalked Beaked Carex.

C. ſpicis cylindricis: fœmineis pedunculatis, vaginis longiſſimis, glumis acuminatis, fructibus triquetris roſtratis bifurcis.

In paludibus. Fl. Maio.

In a marſh near Glaſgow, 1793. *Mr. J. Mackay.* Marſhes near Aberdeen. *Profeſſor Beattie.*

Radix fibroſa. *Culmus* erectus, 2—4-pedalis, triqueter, lævis, inferne folioſus. *Folia* erecta, latiuſcula, lætè viridia, lævia, longiſſimè vaginata; ſuperiora margine aſpera. *Bracteæ* foliaceæ, erectæ, culmum ſuperantes, acuminatæ, acumine aſpero, vaginis longiſſimis, pedunculo tamen brevioribus, ſupremis quandoque breviſſimis et ferè nullis. *Spicæ* cylindraceæ, elongatæ, acutæ, graciles, erectæ; maſculæ ſæpiùs duæ, glumis lanceolatis acutis, frequentiùs mucronulatis; fœmineæ duæ vel tres, longiſſimè pedunculatæ, pedunculis capillaribus, læviuſculis, glumis lanceolatis, mucronulatis, ferrugineis, dorſo viridibus, mucrone ſcabro. *Stigmata* tria. *Fructus* glumis longiores, lanceolato-triquetri, erecto-patentes, nervoſi, haud inflati, virides, glabri, in roſtrum attenuati compreſſum, apice profundè bifurcum. *Semen* fructum implens, triquetrum, breve, fuſcum, pedicellatum.

I cannot refer this to any ſpecies already deſcribed. For ſome time I was in danger of confounding it with *C. veſicaria* in a young ſtate, but the repeated admonitions of Mr. Mackay warned me. Having examined it in various ſtates, I have no doubt remaining.

Its

Its long *vaginæ*, and the fruit being not inflated but filled with the large ſeed, diſtinguiſh it from *veſicaria* and *ampullacea*. It agrees in many particulars with *ſylvatica* and *ſtrigoſa*, but differs in having more than one male ſpike, as well as much thicker and denſer female ones.

I know of no figure of this ſpecies, nor of *C. binervis*; but as I hope to procure freſh ſpecimens for publication in *Engliſh Botany*, I decline offering any delineation of dried ones. A figure of a Carex, in order to be uſeful, ſhould exhibit the fructification in various ſtates, and expreſs particularly the form, ſurface, and nerves of the *arillus*, and the ſhape of the ſeed.

XXIX. *Additional Note to the Remarks on the Nature and Propagation of Marine Plants*, p. 145.

By Lieutenant Col. Thomas Velley, F.L.S.

Read December 3d, 1799.

COLONEL VELLEY wiſhes to explain a paſſage that poſſibly may be ſubject to miſconſtruction in his paper, p. 154. It is there obſerved that the central ſubſtance in *Fucus ſerratus* is never converted into mucilage. His meaning is, that it does not diſſolve, as in *F. veſiculoſus*, leaving the pericarps enveloped in a filamentous ſubſtance. The *F. ſerratus* certainly produces a mucilage in its ſummit, as well as in every other part of its frond at certain periods; and from the indiſcriminate ſituation of this fluid, an argument may ariſe againſt its peculiar reference to the faculty of impregnation, which is confined merely to the ſummit of the plant.

XXX. *Ad-*

XXX. *Additional Note to the Obſervations on the Britiſh Species of Mentha*, p. 171.

By James Edward Smith, M.D. F.R.S. P.L.S.

Read December 3d, 1799.

ON cultivating a root of Mr. Sole's *Mentha pratenſis*, ſent by himſelf, I have found it turn out exactly my *rubra*; and indeed, on an accurate re-examination of his original dried ſpecimen, I find no reaſon to doubt its being truly the *rubra*. To this ſpecies therefore I would wiſh to refer it inſtead of *gracilis*; ſee p. 210 of the preſent volume.

Since the printing of this paper I have met with freſh reaſons for believing the *Mentha ſativa* and all its varieties to form one ſpecies with the *hirſuta*; and in the Flora Britannica, now in the preſs, I have accordingly united them.

XXXI. Extracts *from the* Minute Book *of the Linnean Society.*

April 3, 1798. An account of the *Ardea Gardeni, Gmel. Syſt. Nat. v.* 1. 645, having been ſhot in Oxfordſhire by John Horatio Dickinſon, Eſq. F.L.S. was communicated to the Society.

Nov. 6. The Rev. Mr. Abbot, F.L.S. informed the Society of his having taken the *Papilio Paniſcus (Heſperia Paniſcus*, Fab.) in Clapham-Park Wood, Bedfordſhire. He obſerves that "this *Papilio* is moſt eaſily taken in May and "June, when the *P. Lucina*, or Duke of Burgundy Fritillary, "is out; but the term of its exiſtence ſeems to be longer, "as ſome ſpecimens have been caught, in good condition, "a full fortnight after the *Lucina* has diſappeared. It is "to be found from 7 to 9 o'clock in the morning; very "often playing in pairs juſt after ſun-riſe, or at leaſt as "ſoon as the morning fog has evaporated. Its flight is "extremely ſhort, very near the ground. It delights to "ſettle on the blades of very long Graſſes or *Carices*, and "is far from being a timid inſect." Mr. Abbot wiſhes to name it the Duke of York Fritillary. With its *larva* and *pupa* he is unacquainted.

CATA-

CATALOGUE

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END OF THE FIFTH VOLUME.

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ERRATA in VOL. IV.

Page 172, line 4 from the bottom, *before* "peculiar" *insert* "any."
176, line 6, *for* "uropæi" *read* "Europæi."
178, line 15 and 16, *for* "ſuperiùs" *and* "inferiùs" *read* "ſuperius" *and* "inferius." The ſame errors again occur p. 180 and 183.
180, line 20, &c. *read thus* "foliolis nunc bifidis, laciniis anguſtiſſimis æqualibus; nunc lanceolatis, integris, vel uno latere inciſis."
209, line 6, *for* "ſon" *read* "ſon'."
229, line 25, *for* "in what darkneſs we were before" *read* "where we were in darkneſs before."
231, line 20, *for* "exuvia" *read* "exuviæ."
232, line 17, *for* "linearis" *read* "linearem."
line penult. *for* "to" *read* "into."
235, Note, line 3 from the bottom, *for* "felicitates" *read* "felicitatis."
line penult. *for* "pulchredine" *read* "pulchritudine."
251, line 8, *for* "extended" *read* "extend."
256, line 3 from the bottom, *inſtead of the* ſemicolon *put a* comma, *and for* "for" *read* "as."
258, line 23, *for* "having, beſides ſomething ſimilar to it," *read* "have ſomething ſimilar to it, namely.'"
265, line 4 from the bottom, *for* "accuminatæ *read* "acuminatæ."
269, line 16, *for* "ſaturatæ" *read* "ſaturate."

Tab. 19. No. IV. Fig. I. The feeler to which the letter *a* was intended to refer is not engraved.
22. Pauſus microcephalus.
Fig. 4. The dotted lines (*b*) ſhould have been drawn to the tops of the lower joints; and the dotted lines (*f.f*) ſhould have been drawn farther into the jugular triangle.
Fig. 5. For "*b*" read "*c*," and for "*c*" read "*b*."
For "michrocephalus" *read* "microcephalus."
Pauſus Sphærocerus.
Fig. 3. For "*b*" read "*d*," and for "*d*" read "*b*."
Fig. 6. For "*b*" read "*c*," and for "*c*" read "*b*."
For "ſpærocerus" *read* "ſphærocerus."

VOL. V.

Page 4, line 21, the words "*aperturæ margini reflexâ*" are improperly printed in italics.
9, line 4, *for* "iſſued" *read* "iſſue."
12, line 18, *after* "dilated" *inſert* a comma.
19, lines 25 and 26, *for* "the boat" *read* "a boat."
33, line 1, *read* "baſe of the upper mandible," &c.
149, line 26, *for* "directs" *read* "direct."
151, line 2, *for* "poſition" *read* "ſtructure."

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